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POPULAR Computing WEEKLY

SPECIAL TAPE OFFER

35p 19-25 January 1984 Vol 3 No 3

This Week

Preview

Andy Pennell looks at the new QL micro from Sinclair See page 14

Programming

Roy Masefield examines Newton's third law of motion — the law that enables giant engineering structures to be built Page 18.

Spectrum

Maurice Gavin explains the principles of navigation by the stars See page 20

New releases

This week's releases include *Jericho Road* from Shards Software, *Danger Ranger* from Microdeal and *Stellar Dodger* from Terminal Software Page 64

STAR GAME
Draughts on Spectrum. See page 12.

News Desk

Commodore chief resigns

JACK TRAMIEL, Commodore's founder and the driving force behind the company, has resigned as its president and chief executive.

Tramiel began his business career by repairing typewriters in Canada and built Commodore up through the calculator boom of the seventies to its present position where the company holds 40 percent of the world market for low-cost microcomputers.

Former Commodore president Jack Tramiel

His decision to resign "for personal reasons" coincides with Commodore's announcement of a record trading year.

It has become the first microcomputer company to report sales of over $1bn in a single calendar year. This figure — for the year to December 31, 1983 — is more than

Continued on page 5

Quantum leap is now official

SINCLAIR has now formally announced its new £399 QL computer (see *Popular Computing Weekly*, January 12).

First deliveries of the 128K Ram, twin QL microdrive machine, based on the 32-bit 68008 processor, are scheduled for the end of February.

Initially the QL will be sold by mail and orders will be accepted by Sinclair in Camberley from Friday, January 20, onwards.

Each order for the machine should be accompanied by a further £7.95 to cover postage and packaging. Owners may also choose to pay an addition al £35 to join QLUB, the QL User's Group, for a 12-month period.

Members of QLUB will receive a bi-monthly newsletter, and be able to get help with the four software packages from Psion, receive annual upgrades of the software free of charge and be offered peripherals for the QL before non-members.

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Clive Sinclair (left) and Nigel Searle at the QL launch

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This Week

Editorial

If a week is a long time in politics, it can be an eon in the world of microcomputers

Following the announcement of two new micros, Commodore were riding high last week Then Sinclair launched his new QL machine around the 32-bit 68008 processor for just £399 If this did not make the Commodore micros look tame, it at least took some of the gloss away from their launch

As if this were not enough, Commodore's president and chief executive Jack Tramiel announced his resignation This is bound to affect the company which Jack Tramiel built up from nothing to a $1bn turnover While Jack Tramiel will remain as a consultant to the company, there are likely to be further boardroom changes once a successor is announced

And, while Commodore is suffering from a certain amount of 'swings and roundabouts', Sinclair is not having things all his own way either Half-year profits were apparently sufficiently below forecast levels to delay Sinclair's plans for going public later this year It now looks as if Sinclair will not seek a full stock market quotation until early next year

However, for all their current hiccups, Commodore and Sinclair can console themselves with the thought that they are becoming the big two in name micros Even Acorn seems to be slipping behind

Next Thursday

Next week in Reviews David Lawrence takes a look at the latest software for Commodore 64, including *Revenge of the Mutant Camels and Hovver Bovver from Llamasoft.*

When will Bob start hoovering?

ANDROBOT, the American robotics company founded by Nolan Bushnell will sell its three personal robots in the UK through Prism

Topo, the mid-price device in the range, will arrive in early February at around £1,500

Prism's new Topo

Fred (Friendly Robotic Educational Device) — more like a super-Turtle than a personal robot — will be here in late March, and cost £200 Bob (Brains On Board), the most sophisticated of the three, will be launched in the US on February 15 and will arrive last Bob will sell in the US for $2,495 (this compares with $1,595 for Topo and $349 for Fred)

Both Fred and Topo are controlled from a computer via an infra-red link Prism is developing a range of interfaces to connect the robots to the Spectrum, BBC and Commodore 64 computers — in the US both machines work with the Apple II

Fred is seen as an educational tool to be used, for example, in conjunction with Logo programming It has a pen holder allowing it to draw and has a high degree of positional accuracy

Topo is more of a household help The snag is that, at present, it does little more than drive about, though it has a built-in speech synthesiser which is programmable from the computer

Said Skip Steveley, Androbot's new president "Robotics isn't going to become an industry until the units are useful " Consequently, a number of add-on units are planned for Topo including robot arms, a lift to pick things up and software packages to enable the robot to recall its environment, sensors, an ultrasonic detector, and a flux-gate compass

By far the most interesting of the machines, though, is Bob, still under development Bob does not need a computer to operate It contains its own 8088 processor on board (the same as the IBM PC), with 64K Ram expandable to 256K Bob also has two Rom chips One contains the primitive commands such as *Move*, *Rotate*, *Read*, *Stop* (written in PLM and assembler), and the other contains the Forth language Basic will follow on an optional Rom Bob also has an 8-slot motherboard option giving up to 640K Ram

Androbot president Skip Steveley

Says Skip "When we get Bob out, the applications and third party software will come streaming in Bob has a Rom cartridge slot so we will be marketing programs on Rom We are already talking to vacuum cleaner companies about getting Bob hoovering "

Business micro on the advance

THE Advance 86a is a new £400 16-bit home business micro capable of expansion to IBM PC compatibility

The machine — designed by a UK company Advance Technology — is based around the same processor as the IBM PCjr — the 8086 It has 128K Ram and a full-size professional keyboard with separate numeric pad and 10 function keys

Interfaces include Centronics, cassette, light-pen and twin joystick ports, and the Advance 86a has tv, composite video and RGB outputs

It has high-resolution graphics, 16 colours, one sound channel and its own version of the Basic language built-in, addressing 62K Ram

The 86a can be upgraded to an IBM compatible machine — the 86b — for an extra £980 For this you get twin disc drives, RS232 interface, and 128K more Ram

Although the first of the new Advance 86 machines are expected to be manufactured in early February, volume production is not scheduled to begin until March

Sinclair QL

Continued from page 1

Sinclair plans an ambitious list of peripherals for the QL 0 5M Ram expansion module, Winchester hard disc interface, terminal emulator, analogue/digital interface, modem, parallel Centronics interface and multichannel sound generator and an IEEE-488 interface

The QL will be manufactured exclusively by Thorn EMI Datatech

In the autumn the machine will go on sale through retail outlets in the UK and will be launched in North America In the US it will sell for $499 and be marketed by Sinclair, initially by mail-order

Commodore

Continued from page 1

double the previous year's total sales of $458m

Commodore's chairman, Irving Gould, announced that Tramiel's successor has been selected and will be named when formal agreement of the appointment has been reached Tramiel will continue as an adviser to the company

Alas poor Oric

THE Oric 1 is dead Long live the Oric Atmos

Oric announced this week that it had ceased production of the £139 Oric 1 on Monday, January 16 Curiously enough, Oric started production of its new 6502-based 48K Atmos on the same day

The new 6502-based Oric Atmos

Although programs written in Basic for the Oric 1 will be compatible with the Atmos machine, the new Rom means that machine code programs may need some alteration

The machine has several new Basic commands as standard — *Print @*, *Auto Repeat* on each key and improved cassette control including *Verify Store* and *Recall* The *Grab* command allows programs to use memory normally reserved for the display At least 44K of Ram is available to the user from Basic

Priced at £170 the Atmos is viewed by Oric as the successor to the Oric 1 Accordingly, the Oric four-colour printer and the three-inch Hitachi disc drives now scheduled for full production by the end of this month will be styled to match the new machine

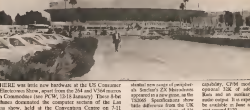
Cross-compilers for 64

OXFORD Computer Systems has announced a pair of cross-compilers for use as Commodore 64 software development tools

The two packages — *Portspeed* and *X-64* — allow a software house to compile source code or generate object code on the Commodore 8000 series machines and then down-load the code to run on the Commodore 64

Details from Oxford Computer Systems, Hensington Road, Woodstock, Oxford

Commodore steals the show at Las Vegas



THERE was little new hardware at the US Consumer Electronics Show, apart from the 264 and V364 micros from Commodore (see *PCW*, 12-18 January) These 8-bit machines dominated the computer section of the Las Vegas show, held at the Convention Centre on 7-11 January

Based around the 7501 processor, the two micros have similar capabilities, though the more advanced V364 has an additional speech facility with a 250-word vocabulary built in

The most impressive features of the new machines were their screen window capabilities (reminiscent of Apple's Lisa) and the accompanying software The *3-plus-1* package, which consists of a word processor, electronic spreadsheet, file management and graphics facility, will be available as a built-in option or as an additional cartridge for the 264 It will also be offered as a cartridge on the Commodore 64

Quicksilva US President Carl Zeigler

Other Commodore software packages announced at the show included *Magic Desk II* — an integrated text-editor, spreadsheet, file manager and calculator for beginners, *Superscript 264* — a multi-function word processor, *Easycalc 264* — a spreadsheet with colour selection, *B/graph* — a simple business and statistics package and *Commodore Logo* — a language facility which includes seven programmable sprites, music, floating decimal-point arithmetic, picture saving and program tracing The *Logo* package will cost less than $80, but prices for the other packages have yet to be finalised

Commodore 264

Commodore also revealed that it has signed an agreement to use CompuServe, a large US telesoftware database similar to Prestel and Micronet 800 The agreement, involving CompuServe's Vidtex terminal emulator, will enable Commodore users to transfer programs from the CompuServe database to their own micros, providing they have the appropriate modem

Timex were also present at the show, exhibiting the TS2068 — the US equivalent of the Sinclair Spectrum Despite an impressive stand, most dealers were sceptical about Timex's ability to make any impression on the US market Timex refused to disclose figures on sales of the TS2068, but they are widely rumoured to be pitifully small

However, Timex themselves were undaunted by the speculation and announced a substantial new range of peripherals Sinclair's ZX Microdrives appeared in a new guise, as the TS2065 Specifications show little difference from the UK version — access time of 3½ seconds, storage capacity of over 85K per cartridge with a maximum of eight microdrives linked to the computer The only obvious difference between the two is the silver styled case of the US machine

Other peripherals of interest included the TS2060 bus expansion unit It features a standard Centronics parallel interface, for the TS2080 or other 80-column printer, RS232 serial interface with selectable baud rate and high-resolution 80-column black-and-white composite video output Other features of the unit include a standard RGB video output on a nine-pin D connector, an interface and controller for up to eight Microdrives, local area network capability, CP/M mode with optional 32K of additional Ram and an auxiliary level audio output It is expected to be available in June and will cost around $120

Timex also unveiled the TS2050 telecommunications modem, which will allow users to access CompuServe and The Source Although Prestel and Micronet have so far failed to take off in the UK their American equivalents are proving much more popular

The Timex modem includes autodial for the computer keyboard, operates at 300 baud and has built-in modular phone jacks "The TS2050 Smart Modem allows access to data retrieval systems, home banking and shopping, telecomputing and other telecommunications services which greatly expand the uses of a Times personal computer At a suggested retail price of

The TS2068 computer complete with modem, bus expansion unit, microdrives, cassette recorder and 80 column printer.

This US version of Sinclair's Spectrum has 48K Ram, 24K Rom, a 42 key typewriter style keyboard and built in Rom cartridge port. It costs $199.95, has four sound channels and a 32 character, 24 line, full colour display

Normal graphics resolution is 256 × 192, but an enhanced resolution graphics mode (512 × 192) allows a single 64 × 24 character row display or two 32 × 24 displays

$120, the TS2050 can be combined with any of Timex's personal computers and provides an affordable interactive telecommunications service for the consumer," said Michael Jacobs, Timex's Vice President of marketing

Finally, Timex revealed its TS2080 80-column printer Capable of producing 80 characters a second and 800 words a minute, the printer is a high-resolution, nine-pin impact dot-matrix machine It includes 228 Ascii characters

Scott Adams (left) and Spiderman

and both normal and italic alphanumeric fonts, together with a standard Centronics parallel interface to enable it to be used on other home micros Again, it should be available in June, priced around $325

British visitors to the show were interested to see the Timex/Sinclair catalogue Psion's *Flight Simulation* was available on both cartridge and cassette under the TS banner, as were *Vu-Calc*, *Vu-File* and *Vu-3D* Melbourne House's *Penetrator* was available, as were programs from Steve Hughes and Sunshine

Software prices, however, tended to be higher than in the UK The TS version of *Penetrator*, for example, was priced at $39 95 on cartridge and $19 95 on cassette This compares with a UK cassette price of £6 95.

There were fewer British exhibitors at the show than expected, with both Acorn and Dragon/Tano being noticeable by their absence Sinclair's US division was at the show, but only to demonstrate the flat screen tv launched in the UK in September Needless to say no tvs were actually available for sale — production problems appear to have delayed their distribution in both the UK and the US

However, following the launch of the QL micro last week Sinclair has decided to market the new machine in the US itself rather than through Timex This does not bode well for Timex, but it will give Sinclair the chance to tackle the lucrative US market directly A separate US launch for the QL machine will occur later this year

Other British exhibitors included Elan, whose Enterprise 64 and 128 micros are due to be launched in April, and Quicksilva Virgin were also present, sharing the Quicksilva stand

President of Quicksilva US, Carl Zeigler, explained that the company had been busy converting UK games to run on US tv Although some machines, like the Commodore 64 are common to both countries, the two tv systems are different Consequently, parts of the program, such as those dealing with colour have to be rewritten

However, Quicksilva US now has a range of games ready for sale including *Aquaplane*, *Bugaboo* and *Purple Turtles* for the Commodore 64 and *Time Gate* *Xadom* *Games Designer* and *Ant Attack* for the TS2068

There was also a sizeable contingent of British visitors to the show, notably Mike Barton of Romik, David Ward of Ocean, Neil Johnson of Microdealer, Terry Cartwright of ECC and Robin Bradbeer

There was little evidence of the anticipated links between laser discs and microcomputers But, Coleco announced it is working on an interactive laser disc player that should be available for the Adam by the end of the year Coleco also announced that it has obtained the home computer rights to the popular arcade game *Dragon's Lair* for a reported $2m

Atari, despite the massive losses it suffered last year, refused to be downcast Its new third-party software division, Atarisoft, released seven new titles for the Commodore 64, IBM PC, Vic20, Apple II and TI 99/4A The games are *Jungle Hunt*, *Glaxian*, *Moon Patrol*, *Ms Pac Man*, *Pole Position*, *Battlezone* and *Joust*

Atari also announced a link-up with Walt Disney to produce a two-part game *Captain Hook's Revenge*

California-based Electronics Arts was responsible for some of the more innovative software on display at the show *MULE* for Atari and Commodore 64 is a multi-player game that combines business

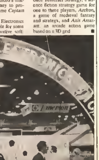
Skyfox by Ray Tobey

simulation and strategy with arcade action The object of the game is to settle a distant planet where you can search for minerals, buy land, grow food, not to mention bartering and gambling with the other players *MULE*, in case you're interested, is an acronym for Multi Use Labour Element

Skyfox is a superb mix of flight simulation and strategy arcade game Seated in the cockpit of 'one mean flying machine', you have two laser cannons, heat-seeking missiles and land mines at your disposal You are also equipped with an attack computer plus radar, altitude fuel and shield indicators, a tactical map and a link-up to your colony's base computer

But, you have 500 square miles to protect, while the enemy invaders have tanks fighters, missiles and powerful mother ships

Electronics Arts also produce *Tesseract Strategy*, a science fiction strategy game for one to three players, *Archon*, a game of medieval fantasy and strategy, and *Axis Assassin* an arcade action game based on a 3D grid ■





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MACHINE CODE

Pidentity crisis

I am writing to you from a small dark corner in Pimaniacs UK. My accomplice who does not like Pimania (shock, horror) Jason Scott Warren, is the only person I know to have managed to shoot the dragon himself. He has also let me loose on the game 'FOLLOW DO' is really great.

Oh yes, and before I forget, here is a thing to remember "The Pi Man has a Pidentity crisis."

Bye for now,
The Nutcracker (Pimaniacs UK)
Alias John Yeates

Mallard
10 La Petite Sente
Le Bourg
St Clement
Jersey

Ten victims

I would like to inform D Claypole and B Vivers (*PCW*, Vol 2, No 49) that I, too have rescued 10 victims and have scored 44089 in just under 22½ minutes.

Adam Cohen
Inner Park Road
Wimbledon
London SW19

Piracy files

'CTA piracy files stolen' says headline in *PCW*, News Desk, 5-11 January. 'Guild of software houses estimated that sales revenue lost because of piracy in 1983 could be over £100m.'

The files were stolen from CTA secretary Nigel Backhurst. In the previous News Desk article about an appeal for funds to continue a legal battle with Waddingtons about *Monopoly* which was obviously copied without permission by Automata, he was quoted 'If they (Waddingtons) win, about 80 percent of the games software on the market could become challengeable.'

Does that mean what I think? That about 80 percent of software ideas are stolen, pirated, used without permission — call it what you will — in the first place?!

Isn't this the kettle calling the frying pan black in the largest possible way? And, as the CTA may find difficulty in finding someone without sin to cast the first stone, perhaps instead they should concentrate on putting their own house in order.

D J Taylor
24 Joicey Road
Gateshead
Tyne & Wear

Arcade emphasis . . . 1

I am a computer user aged 15 and I read your magazine avidly every week. However, this situation is possibly about to change.

The reason for this discontent is the emphasis placed on arcade games. Week after week your letters column is filled with people boasting about their latest high scores in yet another mindless game devoted to shooting beings from outer space. The Open Forum pages are constantly filled with yet more games.

Whilst I realise that there are many people who enjoy playing this type of game I strongly subscribe to the view that everyone has the right to their own taste. I believe there are a growing number of people who, like myself, are turning their backs to the arcade game and are putting their computers to more useful and intelligent uses.

There are admittedly some articles in your magazine devoted to non-games subjects. However, they constitute a minority of the material in the magazine and, when they do appear, they are usually machine specific.

The type of article I would like to see is the sort where you discuss the suitability of, for example, a database for the average home user and possibly reviews of some of the software available in this category for each of the popular machines.

I realise that this goes against the grain of what appears to be your publishing policy. However, I would be grateful if you would publish this letter as I would be interested to hear other reader's opinions if they would care to write to me.

Steven Mason
The Grammar School
Scorton
Richmond
N Yorkshire
DL10 6DS

We try and cover a wide mix of subjects in *PCW*, from games through machine code to serious applications. We should also like to hear from readers if they think the balance is tipped too far one way or the other.

'It's quantum leap year — let's get married'

Arcade emphasis . . . 2

There have been many pleas by readers for a high score section. How about an arcade corner (similar to Tony Bridge's Adventure Corner) where you review the best arcade games, readers write in with their problems and a high-score section is incorporated? What do other readers think?

Hugh Owen-Jones
Brookhill Road
East Barnet
Herts

PS Can anyone beat 91,200 points on the eighth level of *Lunar Jetman*?

Chequered bug

I believe I have discovered a bug in Psion's *Chequered Flag*. It appears that the best lap time that appears on the screen when the race has ended (either through completing the selected number of laps or crashing) corresponds to the most recently completed lap, not to the lap with the lowest time. I would like to know if anyone else has discovered this, or am I the only one with a dud tape?

P Bookham
52 Cleavelands
Wadebridge
Cornwall

PS My lap record at present is 56.2 seconds on the Cambridge Ring circuit using the Psion Pegasus.

Judging from the letters we have received from other readers, you are not alone in your problem.

Restless morons

Priority one bigots letter. I must say I greatly enjoyed reading L Hewelly's letter (Vol 3 No 1). What uncommon intelligence! What!

I fully agree with LH about the stinking little cartoon, and shudder at the thought of all those sub-intelligent waifs scribbling on magazines (do they come from Rhosych?)

I don't know about the educational programs for the Beeb but then, if you've got a Beeb, surely you're above such trivia? Educational programs would, I suspect, be better aimed at us morons with "hideous little plug sockets" (there's only about a million of us and we'd be ever so grateful). Sum ov us cud probablee lern tu spel, and forsake our "deviant ways" for ever.

Gordon Rice
379 Liverpool Road
Eccles
Manchester
M30 7HB

PS The morons are restless lately. There's a rumour going round the modems that if you write to

TONI BAKER
ZX MACHINE CODE USERS' CLUB
37 STRATFORD ROAD
WOLVERTON
MILTON KEYNES
MK12 5LW

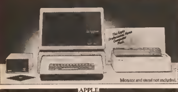
and send a stamped, addressed envelope, all will be revealed.

Mk 14 owners

So Mike Hampson is a veteran because he has a ZX80 (*PCW*, Letters, 12-18 January). What does that make me, bearing in mind that I moved up to the ZX80 from the Mk14 (cost £39.95 + 8 per cent VAT) and still have both of them? Are there any Mk14 owners left?

Paul Adams
(feeling very old)
Hanworth
Middlesex

COMPUTER SYSTEM PACKAGES



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500 sheets of fanfold paper
Package Offer Price £1,225
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Monitor not included

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WHSMITH Computer Shops

Prices correct at time of going to press. Subject to availability. Normal package prices refer to prices of individual product purchases.

Draughts

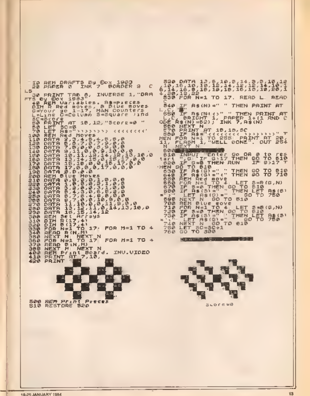
A new game for 16K Spectrum by David Cox

The object of the game is to transpose the red and blue pieces, so finishing with all the red counters on the right and blue counters on the left. A piece can only move diagonally in the direction of the arrow to an empty space or jump over another piece into an empty space. You may start with either colour. All that is necessary to play is to key in the piece number which you wish to move. A Ø will restart the program if you get stuck.

The 16 men and the blank square are stored in sequence as *A$* (17 characters). Each piece has between one and four possible moves. For example, a red piece on square one can move to square two or three directly, or jump over a piece on two or three to reach a blank square on four or six. These moves are stored in arrays *R(17,4)* and *B(17,4)*. A Ø is non-existent move.

The chequered board is printed using inverse video and the pieces are over-printed at line *L* column *C*, whose values are stored as Data at 520. The type of piece >,< or blank is taken from *A$* which keeps an up-to-date record of the game.

In line 550 a blank " " is printed as a graphic square and line 560 determines the colour of the arrows. Line 580 checks for a completed game which takes 52 moves to exchange all the pieces. The main playing routine at 600 notes your move as *G* and checks *A$* to find which colour piece is there. It then tries each of the four possible moves in *R(G,N)* or *B(G,N)* and, when it finds an empty space moves piece *G* to it and blanks out the vacant square. ■



```
 10 REM DRAFTS By ©ox 1983
 20 PAPER 0  INK 7  BORDER 0  C
LS
 30 PRINT TAB 8, INVERSE 1,"DRA
FTS By ©ox 1983"
 40 REM Variables. A$=pieces
 DIM A Red moves, B Blue moves
 G=Your go 1-17, M&N Counters
 L=Line C=Column S=Square find
 SC=Score
 50 PRINT AT 18,12,"Score=0 "
 60 LET SC=0
 70 LET A$=">>>>>>>> <<<<<<<<"
100 REM Red Moves
110 DATA 2,3,4,5,4,5,0,0
120 DATA 6,8,7,0,7,9,0,0
130 DATA 7,8,0,0,8,9,0,0
140 DATA 9,11,0,0,9,10,0,0
150 DATA 10,11,12,14,12,13,16,0
160 DATA 13,14,15,0,15,17,0,0
170 DATA 15,16,0,0,16,17,0,0
180 DATA 17,0,0,0,17,0,0,0
190 DATA 0,0,0,0
200 REM Blue Moves
210 DATA 0,0,0,0,1,0,0,0
220 DATA 1,0,0,0,2,1,0,0
230 DATA 3,2,0,0,3,1,0,0
240 DATA 5,4,3,0,6,5,2,0
250 DATA 6,7,6,4,8,6,0,0
260 DATA 8,7,0,0,10,9,0,0
270 DATA 11,10,0,0,11,9,0,0
280 DATA 13,12,11,0,14,13,10,0
290 DATA 16,15,14,12
300 REM Set Arrays
310 DIM A(17,4)
320 DIM B(17,4)
330 FOR N=1 TO 17: FOR M=1 TO 4
340 READ A(N,M)
350 NEXT M: NEXT N
360 FOR N=1 TO 17  FOR M=1 TO 4
370 READ B(N,M)
380 NEXT M  NEXT N
400 REM Print Board. INV.VIDEO
410 PRINT AT 7,10,
420 PRINT
```

```
500 REM Print Pieces
510 RESTORE 520
520 DATA 12,5,10,8,14,8,8,10,12
,10,16,10,10,12,14,12,12,14,16,1
6,14,16,8,18,10,16,16,10,18,20,1
4,20,12,22
530 FOR N=1 TO 17: READ L: READ
C
540 IF A$(N)=" " THEN PRINT AT
L,C,"■"
550 IF A$(N)<>" " THEN PRINT AT
L,C, BRIGHT 1, PAPER 1+(1 AND C
ODE A$(N)=62); INK 7,A$(N)
560 NEXT N
570 PRINT AT 18,18,SC
580 IF A$="<<<<<<<< >>>>>>>>" T
HEN FOR N=1 TO 255  PRINT AT 20,
11, FLASH 1,"WELL DONE": OUT 254
,N  NEXT N
600 [illegible]
610 INPUT "Enter Go OR 0 to res
tart ",G  IF G>17 THEN GO TO 610
620 IF G=0 THEN RUN   IF G>17 T
HEN GO TO 610
630 IF A$(G)=" " THEN GO TO 610
640 IF A$(G)="<" THEN GO TO 710
650 REM Red move
660 FOR N=1 TO 4  LET S=A(G,N)
670 IF S=0 THEN GO TO 610
680 IF A$(S)=" " THEN LET A$(S)
=">"  LET A$(G)=" "  GO TO 750
690 NEXT N  GO TO 610
700 REM Blue move
710 FOR N=1 TO 4  LET S=B(G,N)
720 IF S=0 THEN GO TO 610
730 IF A$(S)=" " THEN LET A$(S)
="<"  LET A$(G)=" "  GO TO 750
740 NEXT N  GO TO 610
750 LET SC=SC+1
760 GO TO 500
```

[illegible]

Score=0

Sinclair takes his cue

***Andy Pennell** previews the new QL micro from Sinclair*

It's here! The latest Sinclair computer has been revealed to the public much sooner than expected The Sinclair QL, standing for Quantum Leap, was launched last week, and signals a move upmarket by Sinclair into the lucrative, but risky professional market. It seems to offer unrivalled specification at the very low cost of £399

Sinclair do not want the QL to have the games-type image of the Spectrum, so it comes complete with no less than four professional programs written by Psion It also has a real keyboard, which is a first for Sinclair.

The QL looks nice in the statutory Sinclair black with white legends on the keys The keyboard has 65 real keys including a space bar and L-shaped *Enter* key Another first is that the single-key entry system on the previous ZX models has been abandoned, which means a welcome end to the complicated shift operations and cluttered keytops

Along the front of the case are two slots and Leds, which are where the Microdrive cartridges go — yes, the QL has two built-in Microdrives, similar to those on the Spectrum and up to six extra drives can be plugged in the side Although they use the same cartridges, one machine cannot read the others without additional software which although already written, is not expected to be released The QL Microdrives have a minimum capacity of 100K, which is about 15K more than the ZX variety This also means that you cannot add ZX Microdrives to the QL — you must use special QL ones It is not known if QL drives will be as limited in supply as the sought-after ZX ones

Also built in to the QL is the Networking capability that the Interface 1 gives the Spectrum So Spectrum owners who upgrade will be able to use their old computer by plugging it into the new one Up to 64 QLs and Spectrums may be interconnected on the network which with suitable software, will allow peripherals to be shared by all users

Users who want a better picture than their domestic tv can display are catered for with a monitor socket It connects to an RGB colour monitor, or a composite monochrome monitor, but there is no provision for a colour composite monitor (such as the JVC I have just bought), as there was (though undocumented) on the Spectrum

The QL also has two RS232 ports, which are configured differently so that in theory, any RS232 device will work, even in full duplex mode (ie, transmitting and receiving simultaneously) This is unlike the ZX Interface 1 RS232 port which is impossible to use with many modems because of its protocols

Although it is not intended to be a games machine, it has two joystick ports which simulate the cursor and function keys and a Rom cartridge socket which accepts up to 32K Roms. There is also a 64 way expansion connector at one end, into which the 'forthcoming' peripherals will plug The first of these will be a half-megabyte (yes — that's 512K!) Ram pack — it should not experience the famed ZX81 wobble though No price or delivery date has been quoted for this amazing peripheral

A quart into a pint pot

The QL is about the same size as the Memotech MTX500, but lighter as the case is plastic Its small circuit board belies the power and ability of the machine Unlike all previous Sinclair machines the QL does not have a Z80 microprocessor Instead, they have chosen the Motorola 68008 which is a very close relative of the 68000 Sinclair describe it as a 32-bit chip, and compare it to lesser 8-bit chips such as the Z80 and 6502

Although the 68008 does have 32-bit internal registers it has only an 8 bit data bus, like all the others, a bit like squeezing a quart into a pint pot By their terminology, the Z80 is a 16-bit machine which not even its best friends would call it However the 68008 is a very powerful processor, and a measure of the power is that the very extensive Basic fits into a 16K Rom

The 68008 can address up to 1Mbyte (that's 1024K, or 64 ZX81 Ram packs), and the QL is supplied as standard with 128K more than any other micro The screen display takes up a whopping 32K of Ram (equivalent to all the Ram in a BBC B or Dragon 32), leaving about 96K free to Basic With the 1/2M Ram pack, the capacity of the QL rises to a phenomenal 640K

As well as the 68008 processor, the QL has an Intel 8049 slave processor which handles all the trivial tasks such as reading the keyboard controlling the RS232 port, and the sound generation This leaves the 68008 to get on with the more difficult tasks of running the Basic and the Operating System

The sound capabilities of the QL are not really much of an improvement over the Spectrum, using a small internal speaker From Basic it is possible to produce changing sounds 'bouncing' between two frequencies, with control over the fuzziness As the sound is controlled by the slave processor, programs do not stop while the sound is generated

The graphics capabilities are very impressive As the screen takes up 32K resolution is very good with two modes — the first has a resolution of 512 × 256, in four colours, and the second mode has a resolution of 256 × 256, in eight colours with flashing Unlike the Spectrum, each pixel may be a different colour, offering greater potential Further colours are possible in the higher mode by using 'stipples' but this is recommended for monitors only, and not domestic tvs

The maximum number of characters per line is 85, but as most tvs cannot display such detail the maximum for their use is 64 per line *Single* or double height characters are available with up to 25 text lines on the screen

The Basic that runs on the QL is called, subtly, SuperBasic It is a very extended version of Spectrum Basic, similar to that on the BBC micro, but with some unique features of its own Unlike most other real keyboards, there is no *Delete* key to rubout characters — both *Ctrl* and cursor-left have to be pressed instead These keys are conveniently adjacent to one another The keyboard also has five function keys but they do not seem to be programmable BBC-style

I think the most original thing about SuperBasic is the way it handles its variables — as well as numeric and string types integer variables are allowed, and they can be easily mixed — even between

string and numeric For example *Let sum = '1 + '2' + "3* and *Let sum$ = 12 + '344* are both valid, as SuperBasic always tries to convert types wherever possible This seems to have removed the need for the *Val* and *Val$* functions, and no mention of them is made in the preliminary manual Although this *coercion* is very useful it will make program debugging rather harder

Floating-point variables can have any value from 10^618 to 10^ + 616, which is unheard of on calculators, let alone computers The maximum for most calculators is 10^99 and on computers is around 10^38 — again the power of the 68008 is shown, as it is extremely easy to store and retrieve large numbers of bytes and very fast at multiplication and division

Structured programmers will be pleased by the inclusion of *If ... Then ... Else*, procedures functions, and *Repeat* loops — indeed so much so that the manual says *Goto* and *Gosub* are redundant instructions and are only included for compatibility with other (presumedly lesser) forms of Basic



A few idiosyncracies

Most such functions have both 'short and 'long forms, the short for single line definitions, and the long for multiple lines For example, the short form of *For ... Next* loops does not actually require *Next* statements — SuperBasic will automatically repeat the relevant statements Many Basic interpreters object strongly to loops being left unfinished by jumping out of the middle of them so SuperBasic has the *Exit* command which neatly enables the premature departure from *Repeat* & *For* loops, and procedures.

Spectrum Basic had a few idiosyncracies — the bad ones are not in SuperBasic but the good ones are No longer are *Let* and *Then* statements compulsory, array elements now start at 0, and line numbers can go up to 32767 However, the obvious *Ink* and *Paper* (supplemented by the saucily named *Strip*) commands for colour control have been carried over, as have computed *Gotos* and the neat string handling The *Rnd* function can not only create the normal value 0 1, but a value 0-n or a value n-m with a simple change of parameter obviating the need for lines of *Int (Rnd * 10 + 15)* etc There are also double byte *Poke* and *Peek*, and binary *And Or*, *Not* and *Xor*, as well as the regular logical types

A major facility of the QL is that of windows, similar to those on very expensive machines such as the Apple Lisa A window is a section of the screen into which characters can be printed and graphics drawn They are easily controllable from SuperBasic using streams like those on the Spectrum The size, position and colour of each window can be controlled and each may be cleared coloured, printed to, and pixel scrolled with ease

The QL incorporates two Microdrives, using a slightly different format to the Spectrum ones It enables faster data access, and improved memory capacity — they hold a minimum of 100K each Filenames on each cartridge can have a three-letter identifier, à la C/PM and each is stored in a directory on the tape improving performance

Both the windows and Microdrives are controlled by the QL operating system called QDOS It is contained in an amazing compact 18K Rom which seems to be very powerful It also controls the Network supervises RS232 and handles all other input/output. It is also designed to be able to serve Roms in peripherals, such as hard-discs, so other devices and their controlling software can be added to the QL.

A major ability of QDOS is the multitasking feature, that allows many programs to run simultaneously, using timeslicing At the QL launch a monitor showed 10 programs running at the same time, but it was not made clear whether they were Basic or machine code

Supplied free of charge with the QL are four professional packages, written by Psion of a very high standard indeed The packages are cleverly named *Quill, Abacus, Archive* and *Easel*, and are a word-processor, spreadsheet database, and graphics package respectively Although none of the packages has yet been examined in great detail all have been seen in use and appear excellent They are very user-friendly and visually attractive

The first deliveries of QLs should begin at the end of February but most people regrettably now take Sinclair delivery dates with a large pinch of salt, because of their record Shortly we should see the launch of the new Apple and Acorn machines, and it should be interesting to see how the QL shapes up The Sinclair QL is certainly a Quantum Leap above the present sub £1 000 micros but it is a risky market and Sinclair could come unstuck if he fails to produce the goods in the required quantity and quality □



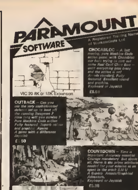


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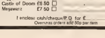

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Building bridges . . .

***Roy Masefield** demonstrates the importance of Newton's third law of motion*

I mentioned Newton's three major laws last week and showed the importance of the first in predicting the motions of bodies. The present article concentrates on the third law.

It is the third law that enables us to build large edifices and giant engineering structures in a way that was denied the medieval builders. The idea, embodied in the third law, that action and reaction are equal and opposite, was unknown to the early builders and, as a result, more cathedrals collapsed during or shortly after building than remained standing. A certain amount of headway was made in understanding static forces when the flying buttress was invented, but the real breakthrough came when Newton showed that for any force to be held in equilibrium, an equal and opposite force must be applied. Some people find it hard to believe that if you push against a brick wall, the wall pushes back with the same force. But if you replace the wall by a second person then it is not at all difficult to see that if he does not push back with an equal force, he will fall over. And, if he pushes back with a greater force, you will fall over!

We can extend the principle to a number of forces all acting at the same point. Let's take just two for a start, as in Figure 1. F_1 and F_2 represent the forces as *vectors*, ie, their lengths are proportional to the values of the forces. For example, the vector for F_1 could be 5cm to represent a force of 5kg. Now these two forces can be replaced by a single resultant force (R) found by completing the parallelogram. The stabilising force to produce equilibrium is just one force (E) in the opposite direction, as in Figure 2.

Now, this is easy when there are only two forces. If we have more, then it is easier to consider vertical and horizontal *components* of the forces. Figure 3(a) shows a force (F) acting at some angle θ to the horizontal, while Figure 3(b) shows the two components $F\cos\theta$ and $F\sin\theta$ in the horizontal and vertical directions (horizontal and vertical are here quite arbitrary — all that matters is that they are mutually at right-angles). You should be able to see that the resultant of these two components is, indeed, our original force F.

If we have a system of several forces $F_1, F_2, F_3 \ldots$ in equilibrium, it follows from the third law that the sum of all the horizontal components must be zero, as must the sum for all the vertical components. So we can write two equations

$$F_1\cos\theta_1 + F_2\cos\theta_2 + F_3\cos\theta_3 \ldots + F_n\cos\theta_n = 0$$
$$F_1\sin\theta_1 + F_2\sin\theta_2 + F_3\sin\theta_3 \ldots + F_n\sin\theta_n = 0$$

Such systems of forces will be encountered throughout the engineering world. As an example, take the case of a simple girder construction as in Figure 4. This structure is supported at the two ends and the load (L) acts at the point shown. Obviously, each support must exert an upward force of $L/2$ to counter the total downward force, otherwise the structure will either sink into the ground or take off.

Each member of the structure will be under either a tensile or compressive force. Compression is indicated by arrows pointing away from each other towards the ends of the member, and tension by arrows pointing towards each other away from the ends.

The calculation of all the forces in the members can be quite tedious, as each point has to be considered separately. We would start at point A, where we have the one known force (F_1) equal to $L/2$, and the two unknown forces U_1 and U_2 at angles θ and zero respectively (see figure 5). So, we can make our two equations

$$F_1\cos 270° + U_1\cos\theta + U_2\cos 0° = 0$$
$$F_1\sin 270° + U_1\sin\theta + U_2\sin 0° = 0$$

These equations may be solved for U_1 and U_2. If F is taken as negative for compression, then negative values for the unknowns will imply compression and positive will mean tension. From point A we can then move on to B using the value of U_1 as the new F_1 for this point. And so it goes on round the structure.

The accompanying program was developed to make all this work as painless as possible. When Run, you will be asked if you want a single force for equilibrium, or two forces in given directions. Then all the known forces are entered. Angles are in degrees, measured anti-clockwise from the east, and forces acting towards the point are compressions (enter *c*) and away from the point are tensions (enter *t*). The printout gives values of the forces and whether they are tensions or compressions and, in the case of the single force for equilibrium, the angle.

Remember you can have as many known forces acting at the point as you like, but you can't find more than two unknowns at any one point (you try to solve three or more unknowns with only two equations!). Often there is a dilemma over this, but it can usually be resolved if the structure is symmetrical and symmetrically loaded, as the forces in each half will be the same.

The program is written for the Sinclair Spectrum, but will easily adapt for other machines since no gimmicks are used. So go ahead and design your own bridges and lattice towers and outdo Brunel, Telford and co. ■

Newton's Laws for Static Forces in Equilibrium (4)

Fig. 1 — F_1, F_2, R

Fig. 2 — F_1, F_2, E

Fig. 3 — (a) F, θ; (b) $F\sin\theta$, F, $F\cos\theta$, θ

Fig. 4 — A, B, U_1, U_2, θ, Load (L), $F_1 = L/2$, L/2

Fig. 5 — A, U_1, U_2, θ, F

Fig. 4. Note that arrows for the unknowns may be put in arbitrarily, since we will not know if they are tensions or compressions until we run the program.

```
5 REM STATIC FORCES IN EQUILIBRIUM
6 REM @ W.R.Masefield 1983
10 CLEAR : CLS : PRINT  TAB 2:"STATIC FORCES IN EQUILIBRIUM": PRINT
20 PRINT "For finding the single force    required to give a svstem of
   several  forces  acting  at  a  point  stable  equilibrium.enter 1.
30 PRINT : PRINT "For finding the forces in two   given members of
   rigid structurewhen all forces in the other    members acting at
   that point areknown. enter 2."
40 IF  INKEY$ ="" THEN  GO TO 40
50 IF  INKEY$ ="2" THEN  GO TO 300
60 REM Single force for equilibrium
70 CLS : PRINT  TAB 2:"SINGLE FORCE FOR EQUILIBRIUM": PRINT : GO SUB
   80: GO TO 140
80 PRINT "Enter known forces as prompted  below. Forces towards the
   point are compressions; forces away   from the point are tensions.
   Allangles in degrees (0-360) are   measured anticlockwise from Ea$
90 INPUT "No. of known forces?";K: DIM F(K): DIM T(K): LET FC=0:
   LET F6=0
100 FOR J=1 TO K: INPUT ("Force F";J;"?");F(J),"Angle?";T(J).
   "Compression or tension (c or t)?";F$
110 IF F$="c' THEN  LET T(J)=T(J)* FI /180+ PI : GO TO 130
120 LET T(J)=T(J)* PI /180
130 LET FC=FC+F(J)* COS T(J): LET FS=FS+F(J)* SIN T(J): NEXT J: RETURN
140 LET FE= SQR (FC*FC+FS*FS): LET P= ATN  ABS (FS/FC)*180/ PI
150 IF FS >= 0 AND FC >= 0 THEN  LET P=P+180
160 IF FS  = 0 AND FC<0 THEN  LET P=360-P
170 IF FS<0 AND FC >= 0 THEN  LET P=180-P
200 CLS : PRINT "Equilibrium Force="; ABS FE: PRINT  TAB 12;
   "Angle=";P: PRINT  TAB 19;'Tension"
210 LET P=P+180: IF P >= 360 THEN  LET P=P-360
220 PRINT  TAB 15;"or ";P: PRINT  TAB 19:"Compression"
230 PRINT : PRINT "N.B. Tension forces act away    from point;
   Compression forces  act towards point"
240 PRINT  AT 21,0;"Fress n for new run, s to stop"
250 IF  INKEY$ ="" THEN  GO TO 250
260 IF  INKEY$ ="n" THEN  GO TO 10
270 6TOP
300 REM Two unknown forces
310 CLS : PRINT  TAB 3:"TWO FORCES FOR EQUILIBRIUM": PRINT
320 GO SUB 80
330 INPUT "Angle of unknown force U1?":P1,"Angle of unknown force
    U2?";P2
340 LET P1=P1* PI /180: LET P2=P2* PI /180
350 LET U1=(FS* COS P2-FC* SIN P2)/( COS P1* SIN P2- COS P2* SIN P1)
360 LET U2=(FS* COS P1-FC* SIN P1)/( COS P2* SIN P1- COS P1* SIN P2)
370 IF U1>0 THEN  LET F$="Tension"
380 IF U1<0 THEN  LET F$="Compression"
390 IF U1=0 THEN  LET F$=""
400 IF U2>0 THEN  LET G$="Tension"
410 IF U2<0 THEN  LET G$="Compression"
420 IF U2=0 THEN  LET G$=""
430 CLS : PRINT "Equilibrium Forces:"
440 PRINT  TAB 2;"U1="; ABS U1; TAB 21;F$
450 PRINT  TAB 2;"U2="; ABS U2; TAB 21;O$
460 GO TO 230
```

Starry, starry night

***Maurice Gavin** presents a program for the 48K Spectrum which demonstrates how to navigete by the stars*

For thousands of years mariners set their course through the night by the stars Today these methods are regarded as obsolete with the advent of radar radio beacons and giroscopes

The modern giroscope may have no moving parts — just laser beams constantly "orbiting" around tiny glass prisms — the slightest movement of which is detectable and used to update the craft's position, in three dimensions if necessary

But, all these systems need a constant supply of electricity to power them Any sustained power loss and the mariner may have to dust down his old sextant and use the stars again

The following program outlines the principles of navigation by the stars from the convenience of an armchair It effectively inverts the problem by accurately animating the appearance of the northern sky for any hour month and latitude in the northern hemisphere as *Input* by the user Two constellations — the Plough (Ursa Major) and the "W" (Cassiopeia) act as hands on a giant star clock with Polaris the north (or pole) star marking the centre of the clock for guidance

To find the observer's latitude is relatively easy — the altitude of Polaris above the horizon in degrees equals the latitude At the equator (0° latitude), Polaris hovers on the horizon, whilst at the north pole (90° latitude) Polaris is directly overhead at the zenith (marked *Z* in the screen display)

The observer's longitude to the east or west of a set line (usually the Greenwich Meridian) proved much more difficult The solution came in 1762 with John Harrison's ship's chronometer which kept accurate Greenwich Time irrespective of its location on Earth It was only necessary to deduce the local time by the "clock" stars like the Plough and compare it to Greenwich Time to extract the observer's longitude For example, a difference of six hours between the two "clocks" is equal to precisely 90° of longitude Today a common quartz watch is a fair substitute for the Harrison chronometer if left to run at Greenwich Time (GMT) whilst the observer travels abroad

Full use is made of the Spectrum colour in the display with a flashing beacon on the horizon pointing to Polaris Each "day" has the correct number of hours of daylight and night-time according to the month and latitude selected — the sky colour changing through each shimmering dawn and dusk A symbolic sun or moon hangs in the sky as appropriate With increasing latitude the animation is shifted up the screen and the user is transported from a tropic isle complete with palm trees to a townscape skyline and finally Arctic iceflows The program runs in a continuous loop and a "day" lasts about 40 seconds The user has four options via one touch *Inkey$* commands to freeze the animation, *Save* the title "picture" on tape via the *Screen$* command to *Copy* the screen to the ZX printer or to rerun for new *Inputs*

Rem statements are liberally included in the program to indicate its structure Half the program (from line 2000) contains and handles the three separate sets of data of star positions hours of daylight (changing the sky colour, etc at sun up and sundown) and the UDG skylines

A$* (line 8160) is a mixture from the Spectrum chunky graphics set and UDG *Chr$ "A" to "F" inclusive The *B$* string starts with 32 blank spaces and then a mixture of the UDG set and the underline sign (symbol shift *0*) to denote the horizon together with a few minus signs (symbol shift *J*) The final skyline in the *C$* string uses chunky graphics, UDG and *Chr$ 95*

Please note that some of the UDG *Chr$* are shared within apparenlty totally different skylines and this is fully acceptable if they are carefully designed for a dual role For example the sloping rooftops become "icebergs" and the "palm tree trunks" become "chimney pots"

In order to speed up the plotting of the two star patterns (Ursa Major and Cassiopeia) in line 350, all the *x* and *y* co-ordinate positions of the 12 stars in 24 separate positions (for each hour of the day) are calculated into the *c* and *d* arrays from lines 2130 to 2200 inclusive This together with the rest of the *Data* takes about a minute to *Read* — line 2070 provides a reminder that all is well — when the program is *Run* When the program is *Saved (Goto 9990)* it automatically starts on *Loading* (via line 9990) and skips the bulk of the *Data* as this is now contained in the tape program

The main *f* loop for plotting the star positions contains two nested loops eg *z* and *n* The *n* loop does the actual plotting and only contains five lines of instructions so as not to slow down the animation One of the instructions is the *Inkey$* command which has its own subroutine from line 430 to 510 The *Poke 23658 8* in line 60 sets the *capital lock*, thus abbreviating the *Inkey$* selection

The *z* loop effectively switches the *Over* command "on" and "off" so that the stars are sequentially plotted then unplotted with a brief *Pause* again controlled by the value of the *z* loop Variables *S* and *S1* in line 260 and 270 determine the hour of sunset and sunrise with separate subroutines ■

```
  10 REM ************************
     * POLARIS-the North Star *
     * © Maurice Gavin - 1983 *
     ************************
  20 GO SUB 2000  REM star data
  30 GO SUB 7000  REM daylight
  40 GO SUB 8000  REM UDGskyline
  50 REM ------------------------
  60 BRIGHT 1  POKE 23658,8
  70 BORDER 0  PAPER 1  INK 9
  80 CLS  INPUT "your latitude(
0-90)",yy  LET LT=1+INT (yy/10)
 IF yy<0 OR yy>90 THEN GO TO 80
  90 INPUT "Month(1-12)",M  IF M
<1 OR M 12 THEN GO TO 90
 100 REM ------------------------
 110 LET y2=yy*1.4+17  LET d$=a$
 120 IF yy>70 THEN LET d$=b$
 130 IF yy<30 THEN LET d$=c$
 140 LET M=INT M
 150 LET sun=h(M,LT)
 160 LET S=12-sun  LET S1=12+sun
 170 LET m$="JanFebMarAprMayJunJ
ulAugSepOctNovDec"(M*3-2 TO M*3)
 180 PLOT x,y2  LET y3=y2-y
 190 LET M2=M*2  LET M3=M2+17
 200 IF M3>24 THEN LET M3=M3-24
 210 LET f=1  GO SUB 1500
 220 REM ------------------------
 230 REM        main loop
 240 REM ------------------------
 250 FOR f=1 TO 24  OVER 1
 260 IF S=f-1 THEN GO SUB 1400
 270 IF S1=f-1 THEN GO SUB 1500
 280 PRINT OVER 0,AT 2,28,(" " A
ND f(=10),f-1,"hr"
 290 LET f1=f+M3
 300 IF f1>24 THEN LET f1=f1-24
 310 FOR z=0 TO 1  FOR n=1 TO 12
 320 IF INKEY$<>"" THEN GO SUB 4
30
 330 LET y1=d(f1,n)+y3  IF y1<17
 OR y1>174 THEN GO TO 380
 340 REM ------------------------
 350 PLOT c(f1,n),y1  DRAW 0,1
 360 PLOT OVER 0,x,y2  DRAW 0,1
 370 REM ------------------------
 380 NEXT n  PAUSE 50-(49 AND z=
1)  NEXT z  BEEP .1,f+20  NEXT f
 390 GO TO 250  REM repeat loop
 400 REM ------------------------
 410 REM    inkeys commands
 420 REM ------------------------
 430 LET x$=INKEY$
 440 IF x$="R" THEN GO TO 70
 450 IF z=1 AND n=1 THEN GO SUB
480
 460 RETURN
 470 REM ------------------------
 480 IF x$="Z" THEN GO TO 320
 490 IF x$="C" THEN COPY
 500 IF x$="S" THEN INPUT "press
ENTER to save picture", LINE z$
  SAVE STR$ INT yy+m$SCREEN$
 510 RETURN
1000 REM ------------------------
1010 REM    print screen
1020 REM ------------------------
1030 PRINT AT 0,0, PAPER 4;"
POLARIS - the North Star
1040 PRINT AT 6,28,INT yy,CHR$ 1
30,"N",AT 4,28,m$,AT 4,15,"Z"
1050 PRINT INK ink, PAPER pa,AT
16,0,d$, FLASH 1, PAPER 3, INK 1
,AT 20,16,"↑",AT 2,27,""
1060 PRINT AT 21,0, PAPER pa-(1
AND d$=a$)," west          north
     east    "
1070 PRINT #0, INK 4,"Hold freez
e  Screen$  Copy  Run": RETURN
1400 REM ------------------------
1410 REM dawn/daylight display
1420 REM ------------------------
1430 FOR d=1 TO 5  PAPER d  PAUS
E 5  CLS  NEXT d  LET pa=d-1
1440 PRINT AT 8,28, PAPER 6, FLA
SH 1,"day ",AT 15,29,CHR$ 150
1450 LET ink=1+(6 AND d$=b$)
1460 GO SUB 1000  RETURN
1500 REM ------------------------
1510 REM dusk/night display
1520 REM ------------------------
1530 FOR d=5 TO 1 STEP -1  PAPER
 d. CLS  NEXT d  LET pa=d+1
1540 PRINT AT 8,28, FLASH 1, PAP
ER 6,"nite",AT 16,29,CHR$ 151
1550 LET ink=0+(7 AND d$=b$)+(4
AND d$=c$)  GO SUB 1000  RETURN
2000 REM ------------------------
2010 REM Cassiopeia & Plough
  stars  hour angle+declination
2020 REM ------------------------
2030 DATA 2,59,10,56,14,61,21,60
,28,64  REM Cassiopeia
2040 REM ------------------------
2050 DATA 165,62,166,57,178,54,1
83,57,193,56,201,55,207,49  REM
Ursa Major(the Plough)
2060 REM ------------------------
2070 PRINT FLASH 1,"Read data.."
2080 REM ------------------------
2090 REM    calc stars 'orbits'
            around Polaris
2100 REM ------------------------
2110 LET r=180/PI  LET z=0
2120 LET x=123  LET y=80
2130 DIM c(24,12)  DIM d(24,12)
2140 FOR f=1 TO 24  RESTORE 2030
2150 FOR n=1 TO 12  READ a,b
2160 LET AA=360-a/r+z
2170 LET AB=(b-90)*1.7
2180 LET c(f,n)=x+COS AA*AB
2190 LET d(f,n)=y+SIN AA*AB
2200 NEXT n  LET z=z+.26  NEXT f
2210 RETURN
7000 REM ------------------------
7010 REM daylight hours/latitude
7020 REM ------------------------
7030 DATA 6,6,5,5,4,4,3,2,0,0
7040 DATA 6,6,6,6,5,5,5,4,4,0
7050 DATA 6,6,6,6,6,6,6,6,6,6
7060 DATA 6,6,6,6,7,7,7,8,8,12
7070 DATA 6,6,7,7,8,8,9,10,12,12
7080 DATA 6,6,7,8,9,10,11,12,12,
12
7090 DATA 6,6,5,4,3,2,1,0,0,0
7100 REM ------------------------
7110 DIM h(12,10)
7120 FOR n=1 TO 6  FOR f=1 TO 10
7130 READ hr  LET h(n,f)=hr
7140 LET h(12-n,f)=hr
7150 NEXT f  NEXT n
7160 FOR f=1 TO 10  READ h1
7170 LET h(12,f)=h1  NEXT f
7180 RETURN
8000 REM ------------------------
8010 REM  UDG skyline/sun/moon
8020 REM ------------------------
8030 RESTORE 8040
8040 DATA 0,16,56,124,254,254,25
5,255  REM rooftop
8050 DATA 30,89,146,178,92,85,14
9,144  REM tree
8060 DATA 16,16,16,16,16,26,56,1
23  REM chimneys or tree trunks
8070 DATA 8,28,8,28,28,62,62,127
  REM church steeple
8080 DATA 128,192,226,242,203,11
1,159,255  REM icebergs
8090 DATA 1,3,7,14,31,63,127,255
  REM roof or iceberg
8100 DATA 60,126,147,219,239,219
,102,56  REM UDG sun (daytime)
8110 DATA 28,38,7,9,63,14,158,12
0  REM UDG moon (night-time)
8120 REM ------------------------
8130 FOR n=144 TO 151
8140 FOR f=0 TO 7  READ d
8150 POKE USR CHR$ n+f,d
8160 NEXT f  NEXT n
8170 REM ------------------------
8180 LET A$="  AAA A EE    CE D
AA AA   CDD        BB B
   B BB   B
              REM townscape
8190 LET B$=
             EE          EFF
CECEE      AE EA      E
  EC             REM artic seas
8200 LET C$=" 888 8    888     B
8 8  88 8      CCC CA A  CCC    C
C C ACC C
              REM tropic isle
8210 RETURN
9900 REM ------------------------
9990 SAVE "polestar  LINE 40
```

The die is cast

***John Law** presents* Rainbow Towers *— a dice game using colour and sound*

This is a dice game for up to four players. It uses low graphics with colour and sound and a demonstration option is included for first time users. The number of moves taken by each player is recorded.

Notes

10	Initial set up of parameters
60-120	Titles
130	Computer demonstration Y/N
140-170	Input players names
180-330	Print play rods
340-630	**Main play loop**
380-390	Random colour generation
400-420	Print colour
430	Checks colour for next required
450 550	Move colour down rod if match
560	Sets next colour indicator
570	Checks for winner and prints moves
630-650	Closedown

Variables

PL	Number of players	
A$(I)	I=1	PL Players names
N(I)	I=1	PL Next colour indicator
PQ	Final position for printing matched colour	
DS	Rainbow string for titles	

```
10 GOSUB 660
20 REM RAINBOW TOWERS
30 REM.....BY John Law
40 REM.....November 1983
50 CLS
60 PRINTE$:PRINT"   R A I N B O W
T O W E R S":PRINTE$
70 PRINT"GAME FOR A MAXIMUM OF
4 PLAYERS"
80 PRINT:PRINT"A 6 COLOURED DICE
THROWN IN TURN"
90 PRINT"ORDER COLOURS TO
BE PUT ON RODS"
100 PRINT:PRINT"RED";CHR$(143+C(1))
;"....BLUE";CHR$(143+C(2));"
.....ORANGE";CHR
$(143+C(3))
110 PRINT"YELLOW";CHR$(143+C(4))
;".....BLACK";CHR$(143+C(5));".....
WHITE";CHR$(1
43+C(6))
120 PRINT:INPUT"COMPUTER DEMONSTRATION
Y/N";YN$
130 IFYN$="Y"GOTO 750
140 CLS:PRINTE$:INPUT"HOW MANY PLAYERS
(MAX 4)";PL:IF PL<0ORPL>4GOTO140
150 FORI=1TOPL
160 LINE INPUT"PLAYERS NAME ";A$(I)
:A=LEN(A$(I)):IF A>6 THEN A$(I)
=LEFT$(A$(I),6)
170 NEXTI
180 CLS
190 FOR J=0TO383STEP32
200 FOR I=1TOPL
210 PS=J+2+(I-1)*8
220 PRINT@PS,CHR$(138+C);CHR$(133+C);
230 NEXTI,J
240 FOR I=1TOPL
250 PS=384+1+(I-1)*8
260 FOR J=1TO4
270 PRINT@PS+J-I,CHR$(128);
280 NEXTJ
290 PRINT@PS+64,A$(I);
300 NEXTI
310 IF DEMO<>1THEN PRINT@480,"
press"+CHR$(128)+"any"+CHR$(128)
+"key"+CHR$(128)+
"for"+CHR$(128)+"next"+CHR$(128)
+"throw";
320 FORI=1TOPL
330 N(I)=1:NEXTI
340 REM MAIN PLAY LOOP
350 FORJRL=1TOPL
360 REM RETURN TO BACKGROUND COLOUR
370 PRINT@416,S$;
380 R(JRL)=RND(6)
390 HI=C(R(JRL))
400 HJ=HI
410 IFHI<0THENHI=-1:HJ=-14
420 PRINT@416+2+(JRL-1)*8,CHR$(141+HI)
;CHR$(142+HJ);
430 IF R(JRL)<>N(JRL)THEN SOUND1,1:
GOTO 560
440 REM MATCH COLOUR REQUIRED
450 PQ=(13-(R(JRL)*2)):PZ=PQ*32
460 PZ=PZ+(JRL-1)*8
470 CC=143+(C(N(JRL)))
480 PQ=(PQ-1)*32:PQ=PQ+(JRL-1)*8
490 REM PRINT FROM MOVES DOWN RODS
500 FOR MM=2+(JRL-1)*8TOPQ+2STEP32
510 IF MM-32>0 THENPRINT@MM-32,
CHR$(138+C);CHR$(133+C);
520 PRINT@MM,CHR$(CC);CHR$(CC);
530 PRINT@MM+32,CHR$(CC);CHR$(CC);
540 SOUND255-(MM/2),1
550 NEXTMM
560 N(JRL)=N(JRL)+1
570 IF N(JRL)>6 THEN PRINT@416+
(JRL-1)*8,
"WINNER":PRINT" ";:PLAY"
ABCDEEDCBA":FOR
LKJ=1TO500:NEXTLKJ:GOTO630
580 IF DEMO=1THEN FORTT=
1TO300:NEXTTT:GOTO600
590 B$=INKEY$:IF B$="" GOTO590
600 NEXT JRL
610 MOVES=MOVES+1
620 GOTO350
630 PRINT@480," ";MOVES+1;"MOVES...
ANOTHER GAME Y/N";:INPUT Y$:IF
Y$<>"Y" THEN GOTO640
640 CLS:FORI=1TO64:PRINTD$;:NEXT:
PRINT@200,"G O O D   B Y E";
650 END
660 D$=CHR$(128)+CHR$(143):FOR
I=1TO6:D$=D$+CHR$(143+(16*I)):NEXTI
670 E$=D$+D$+D$+D$
680 FORI=1TO64:PRINTD$;:NEXTI
690 PRINT @200,"RAINBOW TOWERS";
700 S$=STRING$(32,143)
710 C=0:C(1)=48:C(2)=32:C(3)=
112:C(4)=16:C(5)=-15:C(6)=64
720 MOVES=0
730 FORI=1TO2500:NEXTI
740 RETURN
750 REM SET UP DEMO PARAMS
760 DEMO=1
770 PL=4:A$(1)="FIRST":A$(2)="SECOND"
:A$(3)="THIRD":A$(4)="FOURTH"
780 GOTO180
```



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School tables

***Simon Pithers** presents a utility program for those people who constantly mislay their school timetable*

This is a utility program for printing out your school timetable, very useful if you keep losing it. The program is very easy to use for inputting the data for the timetable.

Program notes

Program variables
A$ holds user's name for timetable title.
TABLE$(5,8) holds week's lessons.
DAYS for day number
PERIOD for period number

Program Procedures
PROCtitle prints titles
PROCsetup sets up arrays and variables
PROCinputdata for week's lessons data.
PROCdumpdatatoprinter dumps screen picture of timetable to Epsom printer or any other printer
PROCagain run program again Y/N

```
LIST
 10REM ************************
 20REM ** TIMETABLE PRINTER **
 30REM ** Copyright (c)1983 **
 40REM **  Simon C. Pithers **
 50REM ************************
 60MODE7:PROCtitle
 70PROCsetup
 80CLS:DIM TABLE$(5,8):PROCinputdata
 90MODE3:PROCdumpdatatoprinter
100PROCagain
110END
120DEF PROCtitle
130PRINTTAB(7,8);CHR$130;CHR$141;"TIMETABLE PRINTER";
140PRINTTAB(7,9);CHR$130;CHR$141;"TIMETABLE PRINTER";
150PRINTTAB(9,12);CHR$134;"By S. C. Pithers."
160PRINT'''
170INPUT"ENTER NAME",A$:IFLEN(A$)>32 GOTO170
180PRINT"PLEASE TURN PRINTER ON NOW"
190D=INKEY 300
200VDU2,1,27,1,69,1,14:PRINTA$;" TIMETABLE."
210PRINT'''
220VDU3
230ENDPROC
240DEF PROCinputdata
250PRINTTAB(1,13);"FUNCTION KEYS:"
260PRINTTAB(1,14);"F0 DRAMA  F1 MATHS  F2 ENGLISH"
270PRINTTAB(1,15);"F3 ECONOMICS  F4 FRENCH  F5 BIOLOGY"
280PRINTTAB(1,16);"F6 CHEMISTRY  F7 P.E.  F8 PYHSICS "
290PRINTTAB(1,17);"F9 GERMAN       CURSOR KEYS"
300PRINTTAB(1,18);"LEFT COMPUTERS  RIGHT MUSIC"
310PRINTTAB(1,19);"DOWN TEC-DRAW  UP ART"
320FOR DAYS=1 TO 5
330FOR PERIODS=1 TO 8
340PRINTTAB(5,2);CHR$134;"DAY ";DAYS
350PRINTTAB(1,4+PERIODS);CHR$133;"ENTER PERIOD ";PERIODS;"'S  LESSON";
   CHR$130; :INPUT TABLE$(DAYS,PERIODS);:PRINT"       "
360IF LEN(TABLE$(DAYS,PERIODS))>10 GOTO350
370NEXT
380FORX=4TO12:PRINTTAB(0,X);"                                        ";NEXT
390NEXT
400ENDPROC
410DEF PROCdumpdatatoprinter
420CLS
430VDU2,1,27,1,69
440PRINT"***********************************************************************
450PRINT"* PERIOD *  MONDAY  *  TUESDAY  *  WEDNESDAY  *  TURSDAY  *FRIDAY
460PRINT"***********************************************************************
470PRINT"***  1 ***";TABLE$(1,1);SPC(10-LEN(TABLE$(1,1)));"*";TABLE$(2,1);
   SPC(11-LEN(TABLE$(2,1)));"*";TABLE$(3,1);SPC(13-LEN(TABLE$(3,1)));"*";
```



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CHICKAROO: A word recognition game for children Find the missing letter is the name of this game which can be used by up to four players

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```
  TABLE$(4,1);SPC(11-LEN(TABLE$(4,1)));"*";TABLE$(5,1);SPC(10-LEN(TABLE$
  (5,1)));"*"
480PRINT"***  2 ***";TABLE$(1,2);SPC(10-LEN(TABLE$(1,2)));"*";TABLE$(2,2);
  SPC(11-LEN(TABLE$(2,2)));"*";TABLE$(3,2);SPC(13-LEN(TABLE$(3,2)));"*";
  TABLE$(4,2);SPC(11-LEN(TABLE$(4,2)));"*";TABLE$(5,2);SPC(10-LEN(TABLE$
  (5,2)));"*"
490PRINT"***  3 ***";TABLE$(1,3);SPC(10-LEN(TABLE$(1,3)));"*";TABLE$(2,3);
  SPC(11-LEN(TABLE$(2,3)));"*";TABLE$(3,3);SPC(13-LEN(TABLE$(3,3)));"*";
  TABLE$(4,3);SPC(11-LEN(TABLE$(4,3)));"*";TABLE$(5,3);SPC(10-LEN(TABLE$
  (5,3)));"*"
500PRINT"***  4 ***";TABLE$(1,4);SPC(10-LEN(TABLE$(1,4)));"*";TABLE$(2,4);
  SPC(11-LEN(TABLE$(2,4)));"*";TABLE$(3,4);SPC(13-LEN(TABLE$(3,4)));"*";
  TABLE$(4,4);SPC(11-LEN(TABLE$(4,4)));"*";TABLE$(5,4);SPC(10-LEN(TABLE$
  (5,4)));"*"
510PRINT"***  5 ***";TABLE$(1,5);SPC(10-LEN(TABLE$(1,5)));"*";TABLE$(2,5);
  SPC(11-LEN(TABLE$(2,5)));"*";TABLE$(3,5);SPC(13-LEN(TABLE$(3,5)));"*";
  TABLE$(4,5);SPC(11-LEN(TABLE$(4,5)));"*";TABLE$(5,5);SPC(10-LEN(TABLE$
  (5,5)));"*"
520PRINT"***  6 ***";TABLE$(1,6);SPC(10-LEN(TABLE$(1,6)));"*";TABLE$(2,6);
  SPC(11-LEN(TABLE$(2,6)));"*";TABLE$(3,6);SPC(13-LEN(TABLE$(3,6)));"*";
  TABLE$(4,6);SPC(11-LEN(TABLE$(4,6)));"*";TABLE$(5,6);SPC(10-LEN(TABLE$
  (5,6)));"*"
530PRINT"***  7 ***";TABLE$(1,7);SPC(10-LEN(TABLE$(1,7)));"*";TABLE$(2,7);
  SPC(11-LEN(TABLE$(2,7)));"*";TABLE$(3,7);SPC(13-LEN(TABLE$(3,7)));"*";
  TABLE$(4,7);SPC(11-LEN(TABLE$(4,7)));"*";TABLE$(5,7);SPC(10-LEN(TABLE$
  (5,7)));"*"
540PRINT"***  8 ***";TABLE$(1,8);SPC(10-LEN(TABLE$(1,8)));"*";TABLE$(2,8);
  SPC(11-LEN(TABLE$(2,8)));"*";TABLE$(3,8);SPC(13-LEN(TABLE$(3,8)));"*";
  TABLE$(4,8);SPC(11-LEN(TABLE$(4,8)));"*";TABLE$(5,8);SPC(10-LEN(TABLE$
  (5,8)));"*"
550PRINT"*************************************************************
560PRINT''''''
570VDU3
580INPUT "ANOTHER COPY Y/N ";A$
590IFA$="Y" THEN 420 ELSE ENDPROC
600ENDPROC
610DEF PROCsetup
620*FX4,2
630*KEY0 DRAMA|M
640*KEY1 MATHS|M
650*KEY2 ENGLISH|M
660*KEY3 ECONOMICS|M
670*KEY4 FRENCH|M
680*KEY5 BIOLOGY|M
690*KEY6 CHEMISTRY|M
700*KEY7 P.E.|M
710*KEY8 PHYSICS|M
720*KEY9 GERMAN|M
730*KEY12 COMPUTERS|M
740*KEY13 MUSIC|M
750*KEY14 TEC-DRAW|M
760*KEY15 ART|M
770ENDPROC
780DEF PROCagain
790VDU22,7
800PRINT''''':PRINT"ENTER Y IF YOU WISH TO RUN PROGRAM AGAIN":A$=GET$:IF
  A$="Y"
RUN ELSE END:ENDPROC
 810ENDPROC
```

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Getting the message

***Boris Allan** investigates the different functions of the input command*

INPUT This command shares many features in common with *Read* particularly the importance of commas, quotes and colons

Following the word *Input* there may be a string to identify the input required, eg

```
10 INPUT TESTING AS
```

and two extra lines help to investigate the *Input* command

```
20 PRINT AS
30 GOTO 10
```

So try the following inputs

```
J
J
,J
J
J
J;
```

For the first entry J is printed, as with the second entry — though with the information *?Extra Ignored* The routine to accept values for *Input* considers that the comma is a separator, and thus the user has entered two values Only one value is expected, and so the extra value is ignored (it is not possible to store up values for later *Inputs*)

To the third entry a null string is printed, and the extra (ie, J in this case) is ignored As the first item the routine encounters is a comma, it assumes a null input The fourth entry shows that the colon has a similar effect to the comma as J is printed and the extra ignored

The fifth input (ie J;) is output exactly as that (ie J;) The semicolon is not a separator, in fact, it is treated as an ordinary character

The final entry shows the use of the double quotes to make the routine aware that the following set of characters is just that, a set of characters If there is a comma (etc) in the set, it is to be counted In this case the output is J,

To illustrate a bug in the *Input* routines merely hit *Return* after the last item and the string output is J again Hitting *Return* on input does not enter the null string but the string contains its previous value

The use of quotes in *Input* allows the input of graphics commands such as *Clr*, and in this respect the situation has much in common with *Print*.

Change two lines in the program

```
10 INPUT "TESTING ";A
20 PRINT A
30 GOTO 10
```

and then enter

```
1
2E3
2
6
5
2/3
```

The first is non-problemetical and 1 is output, the second entry is also without any problems, and 2000 is output The third entry gives *?Extra Ignored* and then the answer 2 (the fifth entry 5 is similar) The result of entering the fourth entry is *?Extra Ignored* and the value of A output is 0 — the comma is read as a null (ie, zero) entry

The input 2/3 is illegitimate, and an error message *?Redo from start* is output To then enter a valid value is to output the valid value If, however 2/3 is entered (and the error flagged) to then merely hit *Return* prints out the value 2

This is yet another bug What has happened is that the expression 2/3 had been evaluated as far as the / by *Chrget* (in a similar way to *Val* or *Gosub/Goto*) and then the error flagged By hitting *Return*, no value is sent to A and the already existing value (ie the 2 of 2/3) is treated as the proper value

When a user is entering much information, it is very easy to make such an error, and hit *Return* before the proper time

Sometimes when a CMD statement is operative the *Input* tries to take data from the wrong kind of device (eg, a printer), and *?File data error* is output If there is a message with the *Input* (eg *Testing*) then this message is sent to the device which may produce some complications

INPUT# This command takes data from some device in exactly the format expected by the ordinary *Input* command though there is no message The file must first be *Opened*

If the data has been sent to the device by *Print#* the format is exactly as desired because the two commands are consistent

Input# is rather more touchy about data types and format than ordinary *Input* and though there are no warnings, extra will be ignored The routines for *Input* and *Input#* are almost identical apart from the setting of the file for *Input#*

Both *Input* and *Input#* use the 80 byte buffer (see *Get* and *Get#*), and this is why *Input* cannot be used in immediate mode — Immediate commands are stored in the same buffer

INT(X) This function converts the floating point expression in parentheses into the integer value which is less than or equal to the result of the expression None of the standard restrictions on the size of the floating point expression hold (ie, within the bounds −32768 to 32767), because the result of *Int* is still a floating point number though turned into a whole number

Note the results of the following expressions

```
PRINT INT(3 1)
PRINT INT(−3 1)
PRINT INT(4 6 + 5)
PRINT INT (−4 1 + .5)
PRINT INT(1/2)
PRINT INT(−1/2)
```

which are 3, and then −4 (*Int* always rounds down) next are 5 and −4 (rounded to the nearest whole number) and the next pair produce the answers 0 and −1 (note that the *Int* of −1 divided by 2 is −1)

The rounding down is shown by reference to the integer division

```
X%=−3 Y%=2 Z%=X%/Y% PRINT Z%
```

to which the answer is −2 The two's complement form of the number −3 is 1111111111111101 and to divide a binary number by 2 we move all bits to the right inserting a 0 at the leftmost position (eg, 4 is 100 as a binary number and 2 is 010) Thus, the number becomes 0111111111111110

This number is now a positive number and in two's complement is 32766 It is a poor system in which half a minus number is a plus number, so divide the sign bit reinserted in the leftmost position The binary number formed from the division by 2 is thus 1111111111111110 and as a two's complement number is equal to −2

The actual *Int* routine works by taking the result from *Fpa #1*, converting it to a four byte integer, and then converting the

Continued on page 32



Continued from previous page
four byte integer into a floating point number in *Fpa #1*, keeping the old exponent

LEFT$(S$,1%) This function takes the string *S$* and extracts the first I% characters of that string The value of I% can be from 0 to 255, and if it is greater than the length of the string all the string is returned For example

```
PRINT LEFT$( 1234" 6) LEFT$( 1234  2)
```

outputs the string 1234 and then 12 If the length is zero, then the null string is output.

The routine works by taking the string pointers off the stack, where they are pushed as part of any string evaluation The length of the string is compared to the value (I%) provided by the function and the lower value is taken. The string selection routine then uses this information (which has been replaced on the stack) to set up the new string.

LEN(S$) This function finds the length of the string *S$* by effectively using the byte which gives the length of the string The length byte is popped off the stack

LET is not needed

LIST This command shows the content of part or all of a program, in a form which is similar to that in which programs are entered

There are the following alternative methods of *Listing* a program

```
LIST
```

will display all the program,

```
LIST 200
```

will display the content of line 200,

```
LIST 600-800
```

will display all lines from 600 to 800 (Inclusive)

```
LIST -800
```

will display all lines up to and including 800, and

```
LIST 600-
```

will display all lines from 600 to the end of the program

If a program has been *Stopped* in some manner it is possible to *List* and then to *Cont* However if the *List* command is within a program, eg

```
1 PRINT "$$$$$
2 REM
3 REM
4 LIST
5 PRINT "#####"
```

to RUN this program *Lists* it out but the program does not continue to line 5 (and the *Print*) To use *List* within a program stops all further computation If you manage to *Stop* the listing part of the way through (easier with a longer listing), *Cont* then moves control to line 5, but the rest of the *List* is lost

When *Cont* is used after the program has ended, the *List* is reactivated, and the program is listed again However the whole program is not re-run, because the first line of $$$$$ is not output — only the *List* The *Cont* should start the program from where it "finished", but using *List* confuses the issue and *List* is repeated (and stops the program)

If line 4 is erased and the program *Run*, then to use *Cont* does nothing — apart from the system telling you it is *Ready* To alter line 4 to

```
4 LISY
```

produces a *?Syntax error in 4* and then trying to *Cont* gives *?Can't continue error*

The reason for these peculiarities of *List* is that its use within a program involves extensive use of pointers, and if *Cont* is used, *Cont* tries to use those same pointers The status of the pointers becomes unclear This is another bug, not serious, but one which should not happen with a clean Basic

It is possible to *List* to a device by *Opening* a file and a device and then using *Cmd* (see above).


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Mastermind

on BBC Micro

Mastermind is a game of logic and skill. It is a one-player game in which you have to guess the colour code which has been selected by the BBC in the right order. In the game there has been introduced two skill levels and a limit to the number of guesses. After the instructions you are given a display of the board, a colour code and at the top right-hand of the board you must input your guesses 1 2 3 4 5. After inputting a guess from 1-8 press return, do this for each five of your guesses and then the board will be updated. The proper rules are included in the game.

Add these lines to make the code even harder to find

```
345    C = 1
390    FORM = 1 to 5  FORN - TO 5  IF B(M) -
       A(N) A = 1  PRINTTAB (18 + C lev +
       6)
405    IF B(M) - A(M)PRINT TAB (18 + C lev +
       6)  +
420    NEXT
425    IF A = 1 THEN C - C + 1  A = 0
427    NEXT
```

When the computer tells you your guesses are + − (correct, correct but in wrong position, incorrect) it will not state which are which. It will only state that one of your guesses are + − but not which one. So it is up to you to work out what you have right or wrong.

Main variables

level	Whether a hard or an easy game has been chosen for play
diff	Maximum amount of guesses player can take
A(1) — A(5)	Number of colours picked by computer
B(1) — B(5)	Number of colours picked by player

Proc statements

Procsetup	Draws the screen layout
Proccalc	Randomly picks computers colours
Procgame	The main part of the program where the player inputs his guesses, the computer checks whether they are correct and updates board
Procend	Ends game

Game order

10-150	Prints instructions and sets variables on your inputs to how long you want the game to be and on what level hard/easy
160	Controls procs for game
170-310	Sets up screen
330	Selects computer colours
340-440	Main part of program where the player inputs his guesses at the code computer updates board and checks whether players guess was correct
460-490	End of game returns to start

```
10REM MASTERMIND PROGRAMED BY Michael Pearce FOR BBC A/B o.s 1.2
15REM IN APROX 6K
30MODE7 @%=0 PRINTCHR$141;"MASTERMIND" PRINTCHR$141;"MASTERMIND
40PRINTCHR$134 'By Michael Pearce"
50PRINT  AS THE CODEBREAKER YOU MUST TRY AND"
60PRINT DUPLICATE THE CODE SET BY THE COMPUTER'
70PRINT 'THE CODE CONSISTS OF FIVE COLOURED"
80PRINT'BLOCKS ARRANGED IN A RANDOM ORDER"
90PRINT  THE COMPUTER WILL HELP BY TELLING YOU   WHETHER THEY ARE"
100PRINT + CORRECT' PRINT - CORRECT BUT IN WRONG POSITION' PRINT". INCORRECT"
110PRINT  THE ADVANCED PLAYER SHOULD CHOOSE A     DIFFICULT GAME"
120INPUTTAB(0,20 ,"HOW MANY GUESSES MAXIMIUM 1-14  diff
130INPUTTAB 0,21  "HARD OR EASY H/E "level$
135*FX15,0
140IFle el$<> H' ANDlevel$<> E"OR diff>14 AND diff<1 THENSOUND1,-15,5,10 RUN
150PRINT'CHR$136; Any key to continue" A=GET
160PROCsetup PROCcalc:PROCgame
170DEFPROCsetup CLS
180PRINTTAB 11 0);"MASTERMIND" PRINTTAB(11,1);"MASTERMIND"
190PRINTTAB 29 0) 'GUESSES  PRINTTAB(29,1),"GUESSES"
195PRINTTAB 28,2),"1 2 3 4 5'
200PRINTTAB 0 0),CHR$141"CODE" PRINTTAB(0,1),CHR$141"CODE"
210FORN-5TO19STEP2
220PRINTTAB(0 N),CHR$(144+(N-3)/2),CHR$255,CHR$135;(N-  2:NEXT
230FORN-7TO20 PRINTTAB 9,N);". . . . . . ....." NEXT FORN=2TO22
250PRINTTAB 6,N); VDU150,181 135, PRINTTAB(24,N)  'VDU1"; 234 135,140 NEXT
260FORN=7TO25 PRINTTAB H,2),CHR$112 PRINTTAB(N,22);CHR$163 NEXT
270FORN=4TO5 PRINTTAB(8 N), VDU142,255 255 255 255 255 255 255 255 255 NEXT
280PRINTTAB(27 5);CHR$145 PRINTTAB(27,5) CHR$145 PRINTTAB 27,21);CHR$145
290FORN=28TO36 PRINTTAB H 3),CHR$36 PRINTTAB(N 5),CHR$240
300PRINTTAB(N,21);CHR$240 NEXT PRINTTAB(0 3), VDU145,96 96,36
310PRINTTAB 0 21), VDU145 240,240 240 ENDPROC
330DEFPROCcalc:DIMA(5) DIMB(5) FORN=1TO5 A(N)=RND(8) NEXT ENDPROC
340DEFPROCgame FORlev=1TOdiff
350PRINTTAB(27,4 ,          ":FORN=1TO5
351*FX15
355INPUTTAB(26+N*2,4 ,B(N) IFB(N)>8THEN355ELSENEXT
360IFlevel$="E"PRINTTAB(28,lev+6 , B 1)    " B(2) " ",B(    ' ' B 4);' ";B(5)
370PRINTTAB(8,le +6)  FORN=1TO5 PRINTCHR$ 144+B(N)),CHR$255  NEXT
380PRINTTAB(16,lev+6),CHR$135
390FORM=1TO5 SOUND1,-15,200,1 FORN=1TO5 IFB(M)=A(N)PRINTTAB(18+M,le +6), -
405IFB(M)=A(M)PRINTTAB(18+M le +6), +'
406TIME=0 REPEATUNTILTIME>10
420NEXT NEXT
430IFA 1)=B 1 AND A 2)=B(2)AND A(3)=B 3)AND A(4)=B 4)AND A(5)=B(5)THENPROCend
440NEXT PROCend
460DEFPROCend:PRINTTAB 3,23),'YOU CLEVERLY BROKE THE CODE'
470IF lev>diff PRINTTAB  ,23);"YOU FAILED TO BREAK THE CODE'
480PRINTTAB(6 24) CHR$136,"ANY KEY TO CONTINUE",
485*FX15
490FORN=1TO20STEP5 SOUND1 -12,N 5 NEXT H=GET RUN
```

Mastermind
by Michael Pearce



VALH
48K SPECTRUM

Mine Aliens

on Spectrum

A small mining colony has been attacked by aliens, who are now living in the four mine shafts. The aliens are now coming out of the mineshafts to finish off the last member of the colony, who is agitatedly jumping up and down at the bottom of the cliff. You must protect him. Equipped with a laser cannon that can be moved up, down and fired, you have to stop the aliens by shooting down rocks in their path.

You score 100 points if the rocks make a direct hit on the alien and 10 if the alien walks into a rock pile. If you destroy a level of rocks, you get 20 points and another screen. When an alien gets to the little man, the game is over. The score to beat, so far, is 3,190.

The program consists of a loop (lines 120 to 190) with branches. The loop tests for movement of the aliens and laser cannon and whether or not the fire button (0) is pressed.

If an alien is found to be on top of where the rocks used to be, it is made to fall as well, until it lands on the newly-formed rock pile.

When the game is over (when an alien reaches the last survivor), the screen is cleared and score and high score printed. Instructions are given if the player presses i, the program stops when s is pressed or re-run (without resetting high score) by pressing r.

Graphics characters are shown in the listing as their equivalent letter surrounded by a box. Graphics mode should be entered and then the appropriate key pressed to obtain the correct character. Save the program using

Save "program name" Line 20

```
5 LET hs=0
10 GO SUB 3000
15 GO TO 100
20 FOR f=144 TO 153: FOR n=0 TO 7: READ a: POKE USR CHR$ f+n,a: NEXT n: NEXT f
30 DATA 0,207,239,255,255,255,255,255,120,136,BIN 11111100,BIN 11111100,254,BIN 11111100,BIN 11111000,255,255,255,255,255,255,255,BIN 10011011,BIN 11001001,255,BIN 11111100,254,BIN 11111100,BIN 11001000,212,192,128,BIN 00111000,BIN 00111000,BIN 00010000,BIN 00111000,BIN 01010100,BIN 10010010,BIN 00101000,BIN 01000100,BIN 00111000,BIN 00111000,BIN 00010000,254,16,BIN 10010010,204,
40 DATA 0,BIN 11000011,BIN 00111100,BIN 01011010,BIN 01111110,BIN 00100100,BIN 01000010,BIN 01000010,0,2,15,BIN 00111110,250,0,BIN 00111110,16,2,10,2,32,0,84,2,4,0,0,0,0,5,12,BIN 01011110,2
50 GO SUB 3000
100 LET s=0
110 DIM a(4): DIM b(4): FOR f=1 TO 4: PAPER 0: INK 4: BORDER 1
115 PRINT AT 1,0; INK 2;"[illegible]"; INK 5;"[graphic]": LET u=INT (RND*15)+3: LET a(1)=4: LET a(2)=8: LET a(3)=14: LET a(4)=18: PRINT AT 4,0;"[graphic]";AT 8,0;"[graphic]";AT 14,0;"[graphic]";AT 18,0;"[graphic]";AT u,30; INK 3;"[graphic]": RANDOMIZE
120 PRINT AT a(1),b(1);"[graphic]";AT a(2),b(2);"[graphic]";AT a(3),b(3);"[graphic]";AT a(4),b(4);"[graphic]";AT 21,14; INK 5;" ";AT 20,15;"/";AT 19,16;"HELP!": BEEP .01,40: PRINT AT 21,14; INK 5;"[graphic]";AT 20,15;" ";AT 19,16;"     "
125 IF INT (RND*2)=1 THEN LET i=1: GO SUB 200
130 IF INT (RND*2)=1 THEN LET i=2: GO SUB 200
140 IF INT (RND*2)=1 THEN LET i=3: GO SUB 200
150 IF INT (RND*2)=1 THEN LET i=4: GO SUB 200
160 LET a$=INKEY$: IF a$="0" THEN GO TO 300
170 IF a$<>"6" AND a$<>"7" THEN GO TO 120
180 BEEP .01,30: PRINT AT u,30;" ": LET u=u-(a$="7")+(a$="6")-2*(u=15)+2*(u=0): PRINT AT u,30; INK 3;"[graphic]"
190 GO TO 120
200 BEEP .01,20: PRINT AT a(i),b(i); INK 4;" ": LET b(i)=b(i)+1: IF ATTR (a(i),b(i))=2 THEN LET s=s+10: PRINT AT a(i),b(i); INK 4; PAPER 2;"[graphic]";AT a(i),b(i); INK 4; PAPER 0;" ": GO TO 1000
204 GO TO 210
205 LET a(i)=i*4+2*(i>2): LET b(i)=0: RETURN
210 IF ATTR (a(i)+1,b(i))=4 THEN LET a(i)=a(i)+1: PRINT AT a(i)-1,b(i); INK 2;"[graphic]";AT a(i),b(i); INK 0;" ": GO TO 210
220 IF b(i)>13 THEN PRINT AT 21,14; INK 5; PAPER 2;"[graphic]": GO TO 500
230 PRINT AT a(i),b(i); INK 4;"[graphic]": RETURN
300 IF u=0 OR u=3 OR u=4 OR u=7 OR u=8 OR u=13 OR u=14 OR u=17 OR u=18 THEN BEEP .01,-10: GO TO 120
310 LET v=u
315 LET sq=v
320 LET c=12
325 IF ATTR (u,c)=2 THEN GO TO 330
326 LET c=c-1: IF c=0 THEN LET s=s+20: PLOT 236,(21-v)*8+3: DRAW c*8-238,0: PRINT AT u,c;"[graphic]": FOR f=0 TO 20: BEEP .01,f: NEXT f: GO TO 110
327 GO TO 325
330 FOR f=-2 TO -10 STEP -1: BEEP .01,f: NEXT f: INK 5: PLOT 238,(21-v)*8+3: DRAW c*8-238,0: INK 4: PLOT OVER 1;238,(21-v)*8+3: DRAW OVER 1;c*8-238,0
340 PRINT AT v,c; INK 2;"[graphic]": BEEP .01,-20: PRINT AT v,c; INK 4;" ": LET v=v+1: IF ATTR (v,c)=2 THEN PRINT AT v-1,c; INK 2;"[graphic]": GO TO 2000
350 FOR f=1 TO 4: IF v=a(f) AND c=b(f) THEN LET a(f)=4*f+2*(f>2): LET b(f)=0: GO TO 370
355 NEXT f
360 GO TO 340
370 PRINT AT v,c; INK 4; PAPER 2;"[graphic]": BEEP .1,4: BEEP .12,-4: PRINT AT v,c; INK 3;" ": LET s=s+100: GO TO 2000
500 BEEP .1,10: BEEP .1,-10: FOR f=-20 TO 20: BEEP ABS (.001*f),f: NEXT f
505 CLS: PRINT AT 10,5;"score=";: INK 6; FLASH 1;s: IF s>=hs THEN LET hs=s: PRINT AT 15,5; FLASH 1;"NEW HIGH SCORE"
510 PRINT AT 17,5;"high score=";: FLASH 1; INK 0; PAPER 2; BRIGHT 1;hs
520 PRINT ''"Press r to run,s to stop i for instructions"
530 LET a$=INKEY$: IF a$="r" THEN CLS: GO TO 100
540 IF a$="i" THEN GO SUB 3000: GO TO 505
550 IF a$="s" THEN STOP
560 GO TO 530
1000 LET t=a(i): LET v=b(i)
1010 IF ATTR (t-1,v)=2 THEN PRINT AT t-1,v; INK 4;" ";AT t,v; INK 2;"[graphic]": LET t=t-1: GO TO 1010
1020 GO TO 205
2000 LET v=sq-1: IF ATTR (v,c)=2 THEN GO TO 2005
2001 IF SCREEN$ (v,c)<>" " THEN GO TO 2030
2002 GO TO 120
2005 IF POINT (c*8,(21-v)*8+4)=1 THEN GO TO 120
2010 BEEP .01,-20: PRINT AT v,c; INK 2;"[graphic]";AT v,c; INK 4;" ": LET v=v+1: IF ATTR (v,c)=2 THEN PRINT AT v-1,c; INK 2;"[graphic]": LET sq=sq-1: GO TO 2000
2020 GO TO 2005
2030 FOR f=1 TO 4: IF v=a(f) AND c=b(f) THEN GO TO 2040: NEXT f
```

```
GO TO 120
2040 PRINT AT a(f),b(f); INK 4;" "
: LET i=f: GO TO 310
3000 PAPER 0: INK 5: BORDER 0: C
LS : PRINT ''''TAB 5;"■      ■ ■
 ■    ■ ■■■■"
3010 PRINT TAB 6;"■■ ■■ ■ ■■
■ ■"
3020 PRINT TAB 5;"■ ■■ ■ ■ ■ ■
■ ■■■"
3030 PRINT TAB 5;"■    ■ ■ ■
■■ ■"
3040 PRINT TAB 6;"■    ■ ■ ■
■ ■■■■"
3050 INK 2: PRINT ''"TAB 3;" ■■
■  ■ ■■■ ■   ■ ■■■"
3060 PRINT TAB 3;"■ ■ ■   ■ ■
■■   ■ ■"
3070 PRINT TAB 3;"■■■■ ■   ■ ■■■
■ ■ ■ ■■■"
3080 PRINT TAB 3;"■ ■ ■   ■ ■
■  ■■   ■"
3090 PRINT TAB 3;"■ ■ ■■■ ■ ■■■
■  ■ ■■■"
3110 BEEP .5,0: BEEP .5,5: BEEP
.125,3: BEEP .125,3: BEEP .125,3
: BEEP .5,12: BEEP .5,10: BEEP .
125,3: BEEP .125,3: BEEP .125,3:
 BEEP .5,12: BEEP .5,10: BEEP .1
25,3: BEEP .125,3: BEEP .125,3:
BEEP .5,-4
```

```
3996 CLS
4000 INK 7: PRINT ''"       A minin
g colony has been   attacked by
 aliens who are now  living in t
he mine shafts.They  are trying
to eat the last man  of the colo
ny who is at the baseof the clif
f.It is your job to  stop them b
y causing rocks to   fall on the
m or by causing them to run into
 rocks that you have shot down i
n their path.'"   You control a
 laser cannon atthe right of the
 screen which   move up and down
 and fire."''
4010 PRINT TAB 10;"7    UP"'"TAB 1
0;"6    DOWN"'TAB 10;"0    FIRE"
4020 PRINT '"press any key to co
ntinue.": PAUSE 0
4030 CLS : PRINT '''TAB 10;"SCO
RES": AT 4,10; OVER 1;"________"
4040 PRINT ''',"100 if rocks fa
ll on alien"''"10 if alien collid
es with rocks"''"200 new screen i
f you destroy a layer of rock"
4050 PRINT AT 21,0;"press any ke
y to continue": PAUSE 0: RETURN
```

Mine Aliens

Triple

on ZX81

Triple stretches the 1K ZX81 to its limit by being three games in one and it is menu driven. To save bytes *Val* is used on all numbers and consecutive line numbers further reduce the *Goto* and *Gosub* lines. Enter program exactly as listed then save by *Goto* 1000: this ensures program will autostart when *Loaded*.

Program displays on video — 1 FLASH 2 FILUP 3 UFO. Enter 1, 2 or 3 to select game.

GAME 1 A number flashes somewhere on screen. You enter this number and program says if correct or not. Time on video is set by the *Pause* in line 23. (Press 0 to go to Menu.)

GAME 2 Four areas on video are randomly filled by inverse space. You have to guess which will fill first. (Note runs for 130 lots, pauses, then returns to Menu.)

GAME 3 For two players. When UFO goes into hyperspace left player presses 1 and right player presses 0 key. When both ready, press Newline key. Faster player will push the UFO over to opponent's side. Left or Right win displayed on video.

```
(C) COPYRIGHT  G.A.BOBKER 1983

   1 CLS
   2 PRINT "  1.FLASH  2.FILUP
3.UFO"
   3 INPUT A
   4 GOTO A*VAL "20"
  20 CLS
  21 LET A=INT (RND*VAL "99")
  22 PRINT AT RND*VAL "20",RND*V
AL "25";A
  23 PAUSE VAL "3"
  24 CLS
  25 INPUT B
  26 IF NOT B THEN RUN
  27 PRINT "YES"
  28 IF A<>B THEN PRINT "NO.IT W
AS ";A
  29 PAUSE VAL "180"
  30 GOTO VAL "20"
  40 CLS
  41 FOR X=VAL "1" TO VAL "130"
  42 LET A=INT (RND*VAL "9"+VAL
 "1")
  43 LET B=INT (RND*VAL "9"+VAL
 "1")
  44 IF A=VAL "5" OR B=VAL "5" T
HEN GOTO VAL "42"
  45 PRINT AT A,B;" ";AT A,B;"■"
  46 NEXT X
  47 PRINT AT VAL "5",VAL "14";"
END"
  48 GOTO VAL "71"
  50 CLS
  51 LET A=VAL "17"
  52 PRINT AT A/VAL "2",A-VAL "3
▄"
  53 IF A=VAL "1" OR A=VAL "33"
THEN GOTO A+VAL "69"
  54 FOR B=VAL "50" TO RND*VAL "
150"
  55 NEXT B
  56 CLS
  57 INPUT B
  58 LET A=A+VAL "4"*(B=VAL "1")
-VAL "4"*(B=VAL "10")
  59 GOTO VAL "52"
  70 PRINT ,"L WON"
  71 PAUSE VAL "150"
  72 RUN
 102 PRINT "R WON"
 103 GOTO VAL "71"
1000 SAVE "T"
1010 RUN
```

Triple
by G Bobker


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Communicator

on Spectrum

Not many microcomputers can communicate directly with their owners using thought waves, but the Spectrum is one that can — well almost. In Communicator you get a friend to select one of nine squares drawn on the screen, and the computer then asks you which one was chosen. You will invariably be able to answer correctly, and your friends may even go crazy trying to work out how you do it!

If you're feeling clever then look at the listing, and especially at lines 2035 3180 and 3180 to try to work out how it's done before reading further. Here however, is the secret: Ignore all variations in text sound and colour. When the computer offers the first possibility look at the position of the flashing indicator within the offered square. This tells you which square was chosen. Thus if the indicator is in the top left of its square then square 1 is the chosen one. If it is in the centre, then square five was chosen. If it is at the bottom centre, then square eight was chosen, and so on.

```
   1 REM INITIALISE VARIABLES
   5 LET A$=" █   ██   ██   █"
  10 LET B$=" █████ █████ █████"
  11 REM LINE 10 - 3 BLOCKS OF 5 SQUARES
  20 DIM C$(9): DIM D$(9)
  30 LET C$="000111222"
  40 LET D$="012012012"
  60 BORDER 1: PAPER 5
1000 REM GIVE INSTRUCTIONS
1005 CLS : PRINT  TAB 10;"COMMUNICATOR"
1010 PRINT : PRINT "I AM SPECTRUM, THE U
LTIMATE"
1011 PRINT "COMMUNICATOR. I CAN PROJECT
MY"
1015 PRINT "KNOWLEDGE DIRECTLY INTO MY"
1016 PRINT "MASTER'S BRAIN. CAN YOU LEAR
N"
1017 PRINT "TO BE IN TUNE WITH ME TOO?"
1020 PRINT : PRINT "I WILL SHOW YOU 9 SQ
UARES: AND"
1021 PRINT "THEN PROJECT TO MY MASTER TH
E"
1022 PRINT "NUMBER OF THE SQUARE CHOSEN.
"
1030 PRINT : PRINT "PRESS ANY KEY TO SEE
 THE BOARD."
1100 GO SUB 5900
2000 REM CHOOSE A SQUARE + SEND 'MESSAGE
'
2001 CLS : GO SUB 8000
2004 LET F$="111111111"
2005 LET FIRST=1
2006 PRINT  AT 2,19;"PRESS A KEY"; AT 3,
19;"FROM 1 TO 9"
2010 PRINT  AT 4,19;"TO PICK A"; AT 5,19
;"SQUARE"
2011 PRINT  AT 7,24;"OR"; PRINT  AT 9,19
;"PRESS C TO"
2012 PRINT  AT 10,19;"LET ME MAKE"; AT 1
1,19;"THE CHOICE"
2020 GO SUB 5900
2025 LET E$= INKEY$ : IF E$="" THEN  GO
TO 2025
2030 IF E$<"1" THEN  GO TO 2025
2031 IF E$>"9" AND E$ <> "C" AND E$ <> "
C" THEN  GO TO 2025
2034 IF E$ <> "c" AND E$ <> "C" THEN  GO
 TO 2040
2035 LET CHOSEN=( INT ( RND *9))+1: GO T
O 2050
2040 LET CHOSEN= VAL E$
2050 CLS
2060 PRINT  AT 3,4; FLASH 1;"MESSAGE NOW
 BEING SENT"
2070 FOR N=1 TO 10
2080 BORDER  RND *6
2090 BEEP .1, RND *20
2100 NEXT N
```

```
3000 REM OFFER POSSIBILITIES
3001 CLS
3004 PRINT AT 6,6;"IS MY MASTER READY?"
4200 GO SUB 9900
4210 IF INKEY$ ="n" OR INKEY$ ="N" THEN GO TO 9100
4220 IF INKEY$ ="y" OR INKEY$ ="Y" THEN GO TO 3000
4230 GO TO 4210
4500 REM CHOSE CORRECTLY
4510 PRINT AT 9,19;"WELL DONE!"
4520 PRINT AT 11,19;"YOU GOT IT"
4530 PRINT AT 12,19;"RIGHT!"
4540 PRINT AT 14,19;"WONDERS NEVER"
4550 PRINT AT 15,19;"CEASE!"
4560 GO TO 4190
5000 REM MISSED CORRECT SQUARE
5010 PRINT AT 9,19;"MISSED IT!"
5020 PRINT AT 11,19;"YOU CAN'T"
5030 PRINT AT 12,19;"HAVE BEEN"
5040 PRINT AT 13,19;"CONCENTRATING"
5050 GO TO 4170
9000 REM SUBROUTINE - DRAW BOARD + NUMBER SQUARES
9005 PRINT AT 2,0;B$
9010 GO SUB 9100
9020 PRINT B$: PRINT : PRINT B$
9030 GO SUB 9100
9040 PRINT B$: PRINT : PRINT B$
9050 GO SUB 9100
9060 PRINT B$
9070 FOR N=0 TO 2
9075 FOR M=0 TO 2
9080 PRINT AT 4+(N*6),3+(M*6);N*3+M+1
9085 NEXT M
9090 NEXT N
9095 RETURN
9100 FOR N=1 TO 3
9110 PRINT A$
9120 NEXT N
9130 RETURN
9900 REM SUBROUTINE - WAIT FOR KEY PRESS
9905 IF INKEY$ <> "" THEN GO TO 9900
9910 IF INKEY$ ="" THEN GO TO 9910
9920 RETURN
9000 REM SUBROUTINE - SAVE AND VERIFY
9005 SAVE "COMMUNICAT" LINE 1
9010 PRINT "NOW VERIFYING"
9020 VERIFY ""
9030 PRINT "VERIFIED"
9040 RETURN
9100 REM 9000SET SCREEN FOR EDITING
9105 FLASH 0: PAPER 7: BORDER 7: INK 0: BRIGHT 0
9110 CLS : STOP
3005 PRINT : PRINT " PRESS ANY KEY TO LET ME START"
3006 PRINT TAB 7;"QUESTIONING HIM."
3010 GO SUB 9900
3015 PAPER 4+( RND *3): BORDER RND *7: CLS
3020 GO SUB 9000
3022 FOR N=1 TO ( RND *15)
3023 BORDER RND *6
3024 BEEP RND /4, RND *(N*2.5)
3026 NEXT N
3030 GO TO 3030+( RND *5)
3031 PRINT AT RND *5,19;"THIS ONE?": GO TO 3039
3032 PRINT AT RND *5,19;"THIS?": GO TO 3039
3033 PRINT AT RND *5,19;"THAT ONE?": GO TO 3039
3034 PRINT AT RND *5,19;"IS IT THIS?": GO TO 3039
3035 PRINT AT RND *5,19;"MAYBE THIS?": GO TO 3039
3039 PRINT AT 7,21;"(Y/N)"
3060 INK RND *3
3080 IF FIRST=1 THEN GO TO 3160
3090 REM SELECT RANDOM POSITION FOR INDICATOR
3100 LET LINE=3+(( INT ( RND *3))*6)+( RND *2)
3120 LEY COL=2+( RND *2)+(( INT ( RND *3))*6)
3125 REM CALCULATE WHICH SQUARE IT'S IN
3130 LET THIS=3*(LINE>6)+3*(LINE>12)+(COL>5)+(COL>11)+1
3131 REM DISALLOW IF CHOSEN ALREADY
3132 IF F$(THIS)="0" THEN GO TO 3100
3134 LET F$(THIS)="0"
3140 PRINT AT LINE,COL; FLASH 1;"■": GO TO 3300
3150 REM POSITION FIRST INDICATOR TO SHOW CHOSEN SQUARE
3160 LET LINE=3+(( INT ( RND *3))*6)+ VAL C$(CHOSEN)
3180 LET COL=2+ VAL D$(CHOSEN)+(( INT ( RND *3))*6)
3190 LET FIRST=0
3200 GO TO 3130
3300 INK 0
3490 GO SUB 9900
3500 IF INKEY$ ="y" OR INKEY$ ="Y" THEN GO TO 4000
3510 IF INKEY$ <> "n" AND INKEY$ <> "N" THEN GO TO 3500
3520 IF THIS=CHOSEN THEN GO TO 5000
3530 GO TO 3015
4000 REM CHOSEN CURRENT SQUARE
4030 IF THIS=CHOSEN THEN GO TO 4500
4150 PRINT AT 9,19;"WRONG!"; AT 11,19;"WRETCHED"
4160 PRINT AT 12,19;"HUMANS!"
4170 PRINT AT 14,19;"IT WAS"; AT 15,19;"NUMBER ";CHOSEN
4180 PRINT AT 17,19;"O.K., STUPID!"
4190 PRINT AT 18,19;"WANT TO PLAY"; AT 19,19;"AGAIN? (Y/N)"
```

Communicator
by S Springett



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Steer

on Dragon 32

The object of the game is to steer a car round a jagged track using one joystick. If the car should collide with the track edge or hit one of the chicanes then it stops and you have a four-second delay. Times are recorded and the lowest current time displayed. The program plays a tune to show you when a crash occurs.

The program is easy to run with full instructions embedded into it. It uses high-resolution graphics in colour set one. After a few games you should be more of an expert with the joystick so that this simple game is suitable for people of all ages.

Program notes

190	Initialise lowest score
210-220	Set high-resolution graphics
230-420	Draw the circuit
430-450	Start the race
460-500	Move the car using the joystick
510	Crash?
520-620	Cross the finish line and times
630-720	Instructions

```
100   *********************
110   ***      STEER      ***
120   ***       B Y       ***
130   *** MARTIN YEANDLE ***
140   ***      POULE      ***
150   ***        '_       ***
160   *********************
170
180
190 L=10000
200 GOSUB 630
210 PMODE3,1:SCREEN 1,1:PCLS
220 COLOR 5 5
230 DRAW "BM_0 AR40D20F10H10E20R20D10U10F20F_0F20E_0D40G10E10F20H_0U_0F40F_0'
232 DRAW "D40L20G40U10D10L20H30F10D20L20H_0U20E20L20H10F10G20L_0G20L20D20P20
234 DRAW "E20F20D20R20F20R20D10U10R20F20P20D10H10E_0F20D20L10F10G50E10F20U40'
236 DRAW "H10F10L40U10D10L20H20L20U10D10G20L20L0H10
240 DRAW 'F10D20L40H20G20L20"
250 DRAW "BM0.20F40F10G10F20R20U30D10F40U10U10F20R20L10G10D_0F40E20H_0F10R.0
252 DRAW 'D20F10H10G40L20H20L_0D20F10H10U20E_0P20L40D20L40D_0L_0G20D20F_0P 0
254 DRAW 'E20G10F20P20F20U10D10P40U10U10E_0R20E20P10L10D20G20D20F_0E10G10 40'
256 DRAW "D10U10H20L20G20E10H_0L20D20F10H10L_0D10"
260 DRAW 'U10H 03 0L20'
270 DRAW "BM10,0F.44D191L254U191'
280 PAINT 65 10),2,5
290 PAINT(20 40),3,5
300 PAINT 210_5  .5
310 PAINT(60,150) 2 5
320 PAINT(150 10),3 5
330 PAINT 183,50),2,5
340 PAINT(165,25) 3,5
350 PAINT(250 30),3,5
360 PAINT(30.70 .3,5
370 PAINT(130,130),3,5
380 PAINT(70,10 .3,5
390 PAINT(170 1,0  2 5
400 COLOR 7,5
410 DRAW "BM10 1"
420 COLOR 7,5
```

```
DRAW [illegible]
I=0:J=0
TIMER=0
[illegible]
410 IF [illegible] THEN I=I+1:IF I 255 THEN
    I=255 ELSE I=I:Z=PPOINT(I,J):
    DRAW "R1"
420 IF [illegible] THEN I=I-1:IF I<0 THEN
    I=0 ELSE I=I:Z=PPOINT(I,J):DRAW
    "L1"
440 IF Y 40 THEN J=J+1:IF J 191 THEN
    J=191 ELSE J=J:Z=PPOINT(I,J):
    DRAW "D1"
460 IF Y<[illegible] THEN J=J-1:IF J<0 THEN
    J=0 ELSE J=J:Z=PPOINT(I,J):DRAW
    "U1"
510 IF Z=6 THEN PLAY "L60(L12CDEFL
    BGGGE"
520 [illegible]IF I<10 AND J>160 THEN T=
    TIMER/50:GOTO 540 ELSE 460
540 CLS 3
550 PRINT @ [illegible],"YOUR TIME WAS":T;"
    SECONDS"
560 IF T<L THEN L=T
570 PRINT @ 256,"LEST TIME SO FAR
    IS":L;"SECS"
580 PRINT @ [illegible],"DO YOU WANT TO PLAY
    AGAIN";
590 F$=INKEY$:IF F$="Y" THEN 210
600 IF F$<>"N" THEN 590
610 PRINT @ 416,"THANKS FOR PLAYING"
620 END
630 ' *** INSTRUCTIONS ***
640 [illegible] PRINT @ [illegible] STEER";
650 PRINT @ 96,"IN THIS GAME WHICH
    IS CONTROLLEDBY A JOYSTICK ,YOU
    MUST TRY TO";
655 PRINT "   STEER A LINE ALONG A
    CIRCUIT      WITHOUT HITTING THE
    EDGES."
660 PRINT @ 256,"EACH TIME YOU
    COLLIDE WITH THE  SIDES, YOUR
    CAR WILL STOP AND"
665 PRINT "   DELAY YOU FOR ABOUT
    4 SECONDS."
670 GOSUB 730
680 CLS 4
690 PRINT @ 32,"THE OBJECT OF THE
    GAME IS TO     COMPLETE THE
    CIRCUIT AS QUICKLY"
695 PRINT " AS POSSIBLE."
700 PRINT @ 160,"WHEN THE JOYSTICK
    IS IN THE       CENTRAL POSITION
    YOUR CAR"
705 PRINT " WILL BE STATIONARY."
710 GOSUB 730
720 RETURN
730 PRINT @ 462,"PRESS [illegible]
    TO CONTINUE";
740 F$=INKEY$
750 IF F$="" THEN 740
760 RETURN
```

Steer
by Martin Yeandle

Microradio

GW6JJN

Amateur tv

Every now and then a program comes along that shines out among the rest. Such a program is *ATV*, published by the Worthmg and District Video Repeater Group. it costs £5.50 from Robin Stephens, 'Toftwood', Mill Lane, Worthing, Sussex. *ATV* stands for amateur television and to do the program justice it was tested by one who knows about such things, Paul G4INP.

This is what Paul had to say: "*ATV* is probably the most impressive program yet seen in the amateur radio context. Designed for the 48K Spectrum in conjunction with a fast-scan high-definition TV transmitter, *ATV* has 36 features which generate first-class pictures to send direct from the micro.

"Amongst the features are a real-time clock which can be displayed at one of two screen positions and in one of two character sets, two test cards with users call sign inserted, two maps, cross-hatch, flags, colour bars and patterns. User input text may be scrolled across the screen and letters may be magnified. An impressive demo mode is also included.

"From the point of view of an ATV'er, I have no doubt that this program offers an elegant and versatile solution to picture generation. Robin Stephens the programmer, is to be congratulated on producing a well-designed robust program which serves its purpose very well and, indeed, shows the Spectrum to be a very good graphics machine in its own right. Robin is G8XEU and can be contacted at the above address, please enclose a SAE with any enquiries.

Although I am not really into amateur television, I enjoy good programming. *ATV* is written entirely in machine code and in its presentation could teach many software houses a thing or two. For example, there is only one program to load which incorporates its own screen, without the need for loading basic loader plus screen plus program as in most commercial software.

The graphics are breathtaking and when the program draws the Union Jack in high resolution it is hypnotic. The test cards into which one can put one's own callsign are every bit as good as those on the telly.

The high-res maps are my favourite except perhaps for the real time clock display in hours, minutes, seconds and tenths which looks like the kind of thing that is on the screen during Olympic events.

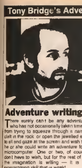
I think it is clear by now that I am very enthusiastic about *ATV* and I certainly give it full marks.

If it were to be left in demo mode in your high street computer shop, it would sell a lot of Spectrums. W H Smith take note. ■

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.


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Adventure writing

There surely can't be any adventurer who has not occasionally taken time off from trying to squeeze through a narrow cleft in the rock or open the jewelled egg, to sit and gaze at the screen and wish that he or she could write an adventure for a microcomputer. One or two, of course, don't have to wish, but for the rest of us, the imagination is willing — it is the programming skill that is weak!

Your wish is now granted (at least if you are a Spectrum owner). Some weeks ago (*PCW* Vol 2 No 50 to be exact), I mentioned *The Quill*. This package, from Gilsoft, is an adventure-writing aid, and does for adventurers what programs like *Hurg* from Melbourne House, and the *Games Designer*, from Quicksilva, do for the arcade fan. *The Quill* sits between the user and the computer's operating system — that is, it handles all the coding for the author, allowing his imagination to run riot.

Many of the adventure-oriented software houses run a similar self-written program. Scott Adams, for instance, uses his own "generator", merely rewriting the scenario for each adventure. Closer to home, Level 9 operates in a similar way, using their 'A-code' compiler as a framework on which to build their excellent adventures. The latest release, *Lords of Time*, was written by Sue Gazzard. Having written the storyline, she then passed it on to Level 9's programming team, who constructed the adventure — and it's another winner!

The Quill, however, is available to anyone with £15. To describe it briefly (refer back to this column in the aforementioned issue, and the December issue of *Micro-adventurer* for more detailed reviews of the program), the author draws a map of his adventure and then constructs a list of the locations, along with all the objects and puzzles, words that the computer should recognise and types them in, using *The Quill*. The program does the rest, and what comes out at the other end is a full-blown, machine-coded adventure.

The framework supplied by *The Quill* takes the standard text form, that is, the location is described, together with the objects to be seen, and then the computer waits for your command. The format used in *The Quill* is of the 'I'm in the ...' kind, but the user can easily change this to 'You are in ...' by using a file already supplied. The difference is subtle, but major, I think.

Colour is under the full control of the user, with text and background colours being easily selected, as well as individual words, which may be highlighted by *Flash*, *Inverse* or *Bright*. Sound is also catered for, although *The Quill* is not particularly ambitious in this area. User-defined graphics may be defined beforehand from Basic, and then loaded into the database.

All this is very clearly described in the large, 52-page manual. Using this, anyone with the minimum of experience can construct an adventure, with imagination the only limit.

Gilsoft have available, for £2, a demo tape which shows the capabilities of *The Quill*. A new adventure, *Magic Castle*, has also just been released, written with *The Quill*. Unfortunately, I believe it does not do justice to the compiler. It is a good, tough adventure in the traditional mould, complete with torches to be lit, keys to be got, forests and minefields in which to get lost, and so on. Such is the reviewer's lot that I haven't ventured far into the adventure, and it may burst into *Zork*-like brilliance in later stages. But so far as I have played it, it is like a steam pudding: satisfying but rather stodgy!

At £8 I find it rather expensive. It would make a good demonstration tape of *The Quill*, but as I've said, Gilsoft already have one available.

Mindbenders from Paul Styles

As for third party adventures written with *The Quill*, Gilsoft don't, I'm glad to say, expect to receive royalties, being content with a mention in adverts and so on. The subject of royalties for the use of compilers in writing games software must be a dead duck — the cost of collecting would outweigh the royalties received. Imagine having to buy a copy of every games tape!

One or two programs have appeared recently written with the aid of *The Quill*, and now reader Paul Styles has sent me a copy of his adventure *Mindbender*. In his covering letter, Paul admits that "it is an entirely amateur production — I am merely an adventure fan". Merely! Anyway, *Mindbender* is exactly what I hoped would result from *The Quill*. Released from the burden of having to write the code as well as the scenario, with all the headaches that poses for most of us, Paul has come up with a smashing adventure.

The adventure starts in my favourite way, at an innocent location with a not too difficult little puzzle as a teaser, to draw the player gently into the main game. In this case, you are sitting in your office — on the desk before you are a diary, a telephone and, of course, a *Quill*! You can fiddle about with these for a little while, savouring the commands (try phoning home, or reading the diary), until, after a certain time, the phone rings. A voice with an odd lilting accent mumbles something in Welsh. It could be relevant to the adventure, but to me, it looks like "*Wales rools OK*"! The net result is that you find yourself falling ... falling ...

The ensuing escapade through some 100 locations is a highly imaginative, well-plotted romp. Styles' fondness for all things Wales-ish crops up from time to time. You cannot just eat any old food when you feel faint and hungry. You'll find a wide choice, but the presence of leeks might ring some bells.

Although the scenario is enjoyable, the puzzles are as tough as any adventurer could wish for. There are none of those awful "Oh dear, you seem to have slipped and broken your neck" remarks. Any accidents you have are a result of your own carelessness, but mostly you'll find several ways of approaching the various puzzles.

In sum, the environment is tough but entertaining and most actions will have some effect, so that the player can move around fairly fast, although not always with pleasing results. Paul has used *The Quill* to very good effect in writing *Mindbender*, with good use of colours and sound (witness the telephone ringing, an obvious device, but not used before on the Spectrum to my knowledge). I can recommend *Mindbender* as an excellent adventure, and as an encouragement to those of you who may be thinking of trying *The Quill*.

Stop press! Just as *The Corner* went to press, I heard that *Mindbender* is now to be marketed by Gilsoft at £5.95.

The Peterborough company, Applications, has also used *The Quill* to write their latest release, *Denis through the Drinking Glass*, which is a comic adventure about the Iron Husband. Some of you may remember my comments, some months ago, about having to occasionally join the queue in the office to get a chance to see a program. Such is the case here ... I haven't actually seen this one, but Graham "Grand Wizard" Taylor is sitting hunched before a monitor, mumbling "Great ... Fantastic!" He assures me that it is one of the funniest, and diabolically logical, adventures he has seen.

Applications has also just released *Archimedes' Magic Screw*, in which you have to help him find the secret of the Universe (and the soap). *DTTDG*'s follow-up is *The Tebbit*! *The Quill* and Applications seem to have made a perfect union!

See you at the nineteenth. Bill, toodle-pip! ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



FOOTBALL MANAGER

Peter May of Dudsbury Road, Sidcup Kent writes

Q Recently, I saw Addictive Games *Football Manager* and I was very impressed with it. But, my friend has a Spectrum, and I would like to know if it is available for a Commodore 64?

A This game is not available on the Commodore 64 as yet, but with the big Christmas sales of this machine you might see a version sometime this year You might be interested in another program called *International Soccer* which is a cartridge available from Commodore for £9 99 and is one of the best simulations I have ever seen

COMPATIBLE DRIVE

P Buckton of Tollys Mill, Cambridgeshire writes

Q Having recently invested in a Commodore 64, I am getting along very nicely. A friend is selling off a Vic20, with a lot of attachments including a disc drive (1540). He is willing to sell me the drive separately. Is the 1540 compatible with my Commodore 64?

A All that will need to be done is that the Rom within the drive will have to be changed The 1540 is called an intelligent drive because it has its own 6562 cpu, and its own Rom, it also has 2K of Ram This means that it can get on with such things as formatting discs while the computer is doing another task You will have to ask your Commodore dealer to get the correct DOS, otherwise I cannot see that you should have any problems assuming that the drive is in correct working order

ROM AND RAM

S Golding of Setters Hill Estate, Baltasound Unst, Shetland Islands, writes

Q Being a novice, when it comes to writing programs in Basic, am I right to say that a program is converted to numbers by the Rom and then stored as numbers by Ram? If so, could you enlighten me on the saying that machine code is faster than Basic? Why is this true if machine code consists of numbers also?

A Yes and no The computer stores the commands as a series of one byte tokens — on the Spectrum these are between 128 and 255 Try these three lines

```
10 FOR a = 128 TO 255
20 PRINT CHR$ (a)
30 NEXT a
```

When a program is Run, the computer will take each phrase in sequence, read it and then call necessary Rom routines to execute it This reading and executing phrase by phrase is called interpreting Each phrase is interpreted separately, as the computer progresses through the program

The process of interpretation takes a long time, hence the use of machine code, which by-passes the calling and reading of each token in turn and deals directly with the cpu Consequently, it is faster

A BUS AND A LINE

Matthew Barnes of Reading Road, Twyford, Berkshire, writes

Q Please could you tell me the difference, if any, between a line and a bus? And could you tell me whether a data bus and data line are different from an address bus and an address line?

A There are four words here that need defining A line is a single connection between two points A bus, on the other hand, is several of these connections that run from one group of connections to another Thus, a group of lines between say the cpu and the Ram would be a bus

Data and address refer to the type of information carried on the line or bus A data bus or line carries just that, data Obviously address refers to lines that carry addresses

SPECTRUM PRINTER

S Alrega of Alwyn Drive, Longsight, Manchester, writes

Q I intend adding a proper printer to my 48K ZX Spectrum. Could you let me know the points I should bear in mind when buying a printer? Is there a place that I can buy second-hand printers? I want the printer to be able to support Spectrum graphics, and user defined graphics.

A There are a few important things to bear in mind when hooking up your Spectrum to a proper printer First of all, you will need an interface — probably a centronics one is the best to buy — Hilderbay, Kempston, Morex and Tasmen all do reliable ones

The next thing to decide on is the type of printer you need — what will you be using it for? If the answer is mainly program listings and just home uses then probably what you need is a dot matric printer You can buy these from around £200 second-hand or £250 new A big advantage of this type of printer is that, since all the characters are created from dots, there are usually many more options as to what style of print you use, sometimes even a choice of character sets

However, if you intend to do a lot of word processing and formal letter writing you might feel you need typewriter quality print — in which case go for a daisywheel printer which actually prints in the same way as most typewriters, ie with a hammer action These cost around £350 upwards

So far as the question of graphics is concerned, I'm afraid the news is not good — what the printer can print depends totally on what characters it, rather than the computer, is supplied with This rarely includes many graphic shapes and never user defined graphics If you list programs with these in them, you are likely to get either a space or a question mark printed Only if someone brought out a printer specially designed for the Spectrum, but using full width plain paper would you be likely to get all the features you require

For *T Harper of Merseyside* and *Alison Donald of Stirling* Stellar Services of 8 Firtree Vale, Leeds LS17 7EY markets an astrology program for the 48K Spectrum The same company also makes astrology programs for the Dragon 32 and 16K ZX81 The ZX81 program comes in two parts, costing £8 and £10, while the Dragon program costs £15 I'm afraid that I have not been able to find an astrology program for the Lynx

Bob Thomas of Crosby Liverpool, and F Farmer of Cleethorpes, will be pleased to know that the Tandy CGP 115 can be used with the BBC computer It would take an article to deal with the subject, which is what we had in Vol 2 No 14 written by Dan Smith

G Bennet of Newbury D Hawkins of Great Missenden and Val Jenkins of Carlisle, would like to know if the new Atari range of computers will run existing Atari software Fundamentally there is not a great deal of difference between the new machines and the old 400 and 800 The new models will run most existing Atari software They have had the few bugs there were removed, and some new features added With a completely new, and probably cheaper re-styling of the various units within the system, you get the new X1 range There are no plans at the moment for the entire range to be available over here

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.

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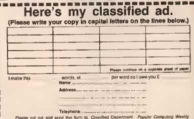
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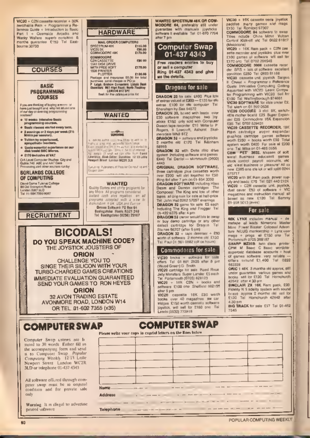
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ORIGINAL DRAGON SOFTWARE, three cartridges plus cassettes worth over £200 will sell together for £50 Ring Bill after 7 pm on 01-854 3350

DRAGON SOFTWARE including Hiss Doom and Demon cartridges The Composer The King and lots of other tapes all originals for sale at half-price Tel John Hall 0262 57057 evenings

DRAGON 32 game for sale £5 each including The King and Frogger Tel 01-422 8075 after 4 pm

DRAGON 32 owner would like to swap or buy demo cartridge or any other defect cartridge for Dragon Tel Staines 56707 (after 6 pm)

DRAGON 32 + tape recorder + £80 worth of software 2 months old £120 Tel Paul 01 561 0882 (office hours)

Commodores for sale

VIC20 books + software for sale offers Tel 01 881 2525 after 6 pm (Wood Green) D Smith

VIC20 cartridge for sale Road Race Jelly Monsters Super Lander £5 each Tel Portsmouth (0705) 828123

VIC20 + 16K C2N + books and software £100 ono Sheffield 882155 after 5 pm

VIC20 cassette 16K £30 worth books over 40 magazines six cartridges £150 worth cassette software joystick, will sell for £180 ono Tel Leeds (0532) 772818

VIC20 + 16K cassette cards joystick paddles many games and mags £150 Tel Romford 67307

COMMODORE 64 software to swap Titles include China Miner Vulcan Control Kick-off etc Tel 0622 61817 (Maidstone)

VIC20 + 16K Ram pack + C2N cassette recorder and joysticks plus over £100 games of software will sell for £170 ono Tel 0702 206548

COMMODORE 3000 cassette recorder BRS + lots of software excellent condition £250 Tel 0923 81166

VIC20 cassette unit joystick Sargon II Chess + Programmer's Reference Guide Innovative Computing Getting Acquainted with VIC20 Learn Computer Programming with VIC20 Sell for £100 Tel Wellingborough 674661

VIC20 SOFTWARE for sale under £2. Tel Mark on 01 992 0536

VIC20 GOODIES 3 slot 8K, switchable mother board £25 Super Expander £25 Commodore 16K Expansion £35 Tel 0702 529431

VIC20 CASSETTE RECORDER, 16K Ram cartridge super expander graphics cartridge games software worth £230 + books worth £50 Total system worth £400 For sale at £200 ono Tel Mike on 01-485 0658

CBM PET 3032. Masses of software! Business educational games stock control payroll accounts, etc etc ideal business or pleasure! All as new £395 ono the lot or will split 0244 675717

VIC20 with 8K Ram pack power supply and leads £70 Tel 021 440 2124

VIC20 + C2N cassette unit, joystick, dust cover £50 of software + VIC magazines and instruction manual all boxed as new £120 Tel Sammy 01-958 5013 (eves)

For sale

48K LYNX includes manual + demo tape all leads Nimerons Master Mine Power Blaster Colossal Adventure NILUG membership + Lynx user mags + progs all £150 ono Tel Portsmouth 0705 388187

SHARP MZ80B twin discs printer CPM M Basic C Basic wordstar supercalc database accounts + host of games software very reliable — offers around £1 400 Tel 0222 882228

ORIC 1 48K 3 months old approx, still under guarantee various games and books sell for £120 Tel Hornchurch 42642 after 4 30 pm

SINCLAIR ZX 16K Ram pack, £20 Fidelity hi fi fidelity system with sound boxes approx 2 months old sell for £120 Tel Hornchurch 42642 after 4 30 pm

BIG TRACK for sale £17 Tel 01-462 7545

COMPUTER SWAP

Computer Swap entries are limited to 30 words Either fill in the accompanying form and send it to Computer Swap *Popular Computing Weekly* 12/13 Little Newport Street London WC2R 3LD or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale only

Warning It is illegal to advertise pirated software

COMPUTER SWAP

Please write your copy in capital letters on the lines below

Name

Address

Telephone

ORIC 48K with software for sale £89 or willing to swap for snooker or pool table (6ft × 3ft with balls) Tel 01 570 2045

TEXAS 99 4A with over £200 worth of Texas software (educational and games) plus joysticks etc all only six months old £125 or reasonable offer Ring Warrand 20354

TANDY LION PRINTER IV, good quality fast thermal printer Tandy price £400 Offers as new £95 Ell II computer – partly built giant books sale £137 last for £50 Tel 01 358 1448

VETREX + SPIKE CARTRIDGE 2 months old £130 or willing to swap for 48K Spectrum Tel Sutton 585183 anytime

SHARP 711, unused Zen Editor assembler + Z80 processor books, sell for £220 Tel 01 504 8107

TI 99/4 EXTENDED BASIC speech synth joysticks Munchman Invaders Football Grammar Early Learning Budget Management, Virgin Games, Cassette Cable current value £290 all for £100 Write F Shirley Edworth Biggleswade Bedfordshire

SEKOSHIA GP250X PRINTER, seven months old hardly used with BBC lead £148 Tel 01 575 1876

TI99/4A plus leads and extras as new boxed worth £170 Will sell for £100 or swap for disc drive or printer for Commodore 64 Tel Farnborough Hants 511248 anytime

ARCADE SOFTWARE for ZX Spectrum owners Pontoon £3 Police Chase £4 Motorway Maniac £3 50 Demon Driver £2 50 Blitz £4 Same day despatch Please make POs etc payable to Mr G Behlell, High View Somerton Hill Langport Somerset

TRS80 SOFTWARE (Level II) 15 memory cassettes over 110 programs including Hundred Library File Handling Moving Signboard Microchess Keyboard Debounce Tandy Instruction Course Even Wumpus any £34 ... one ngr 01 834 5582

Ataris for sale

ATARI VCS as new £35 Tel 0244 26905 (eves)

FOR SALE — Atari software including some latest releases on disc and Rom All originals lust at sale than half-price Tel Slough 71382

ATARI 400/800 SOFTWARE. Star Raiders, Galaxians Chess cartridges Reversi Poker Solitaire Gomoku Chequer SYN Assembler disks Fastgammon Snooker/Bil cassettes Le Stick, Ts300 Teleprinter (requires Serial Interface) £140 Split. Chelmsford (0245) 269030

ATARI 400/800 software original mint bargain Missile Command Defender Star Raider cartridges also sale and some disc Tel 0702 201 637

BBC WORDWISE Word Processor Rom plus cassette demo intel £50 will sell for £25 one as new Tel evenings (0843) 35462 (Thanet)

BBC MODEL B high quality software — Fruit Machine Kiles Line and Code Break, all for only £3 70 (tape) £5 (disc) Rebelsoft 19 Trelawney Road Saltash Cornwall PL2 4DE

BBC (B) SOFTWARE Alligata Bug-Blaster Red Shift Apocalypse Melbourne House Hobbit Aardvark Zalaga Acornsoft Starship Superior Alien Dropout Quicksilva Wizard Virgin Noc e Sinc etc all originals for half price Tel Bourne End 23544

ACORN BBC Disk Drive with around £400 of software good condition sell for £100 sale DFS £56 Tel 01 674 4122

ACORN ATOM 12K + 12K + FP complete with leads and manuals + £120 of Acornsoft software, £100 Humbryen (0480) 76367

Wanted

SWAP 12 DRAGON TANDY cartridges plus some cassette software for colour TV monitor or swap for printer Tel 01-821 1710 after 9 pm

SPECTRUM GAMES to exchange Please send your list of available tapes to exchange I have over 50 top tapes 15 Norwood Drive Brierley Barnsley S72 9EG

WANTED Acorn electron software eg Twin Kingdom Valley Snapper Pengi etc sale preferably other Acornsoft cassettes and books or sound graphics etc Tel Richard 051-733 0090 after 4 pm cannot ballect

MIRCODRIVE ORDER FORM for sale Any errors? Also some secondhand software as new for swap or sale Tel 08623 254 at weekend

SWAP YOUR VIC20 plus C2N and leads plus joystick for my Amstrad tower stack hi-fi system double cassette graphic equaliser and much more worth £250 Tel Woodford 505 8869

WANTED Spectrum 48K software mainly utilities and business i e stock control swap or buy Bourseux 8 Rue M Regnier 75015 Paris, France

SWAP CBM64 Colossal adventure for Isle 9 or channel 8 adventure Tel 0688 270920 after 4 30 pm

WANTED Any Commodore 64 or 48K Spectrum with software Tel 01-881 2826 (Wood Green) D Smith after 6 pm

VOODOO CASTLE OR PIRATES COVE to swap for either The Count or Mission Impossible also Panic Wacky Waiters Catcha Snatcha £3 each 3D Time Trek £4 Tel Wormley (042 979) 2226

COMMODORE 64 with/without peripherals Tel Chepstow 70942

WANTED 48K Spectrum with leads and manuals perfect condition (no tape recorder needed) willing to pay between £50-£70 Tel Andy 958-8943 after 4 pm

COMMODORE 64 WANTED for around £100 Tel 001-773 3621

WANTED A printer for between £100 £200 or below write with printout and details to James Main, Cheners House Top Street North Wheatley Retford Notts DN22 9DB

WANTED Joystick + interface any make must be in mint condition, offering 3D Tunnel Androids Galaxy Attack Hungry Horace Intruders Meteors + Zoom. Write to Derek Scott, 260 Harden Place Hawick Roxburghshire

BBC GAMES FOR SWAP Paras Battlezone 2000 Demon Decorator Hunchback Attack on Alpha Centauri Gunsmoke Tel Canterbury (0227) 58578

ZX81s for sale

48K SPECTRUM plus lots of software Over six months guarantee £110 ono Tel Anil 01 571 2824

SPECTRUM 48K £100 £80 of software seven books Offers! Tel 01-892 8411 after 6 pm (Twickenham)

SPECTRUM SOFTWARE BARGAINS Flight Simulation Arcadia Cruising Orbiter £3 each or £10 for the lot First offer accepted Tel 01 348 3824

SPECTRUM SOFTWARE for sale 16K £2 50 48K £3 00 Titles include Alchemist Push Off Jetpac Pssst, Cookie Arcadia Galaxians Send sae to M Turley 50 Athol Street Middlesbrough Cleveland TS1 4LB

ZX81, 16K plus DK'Tronics cased keyboard 4K graphics Rom UDG rept. module All worth £130 Over £100 software Excellent condition Sell £85 ono Tel Swindon 0793 763247

48K SPECTRUM plus £300-worth of software including Atic Attack Lunar Jetman Pssst, Trans Am and lots more £100 Tel (0924) 274022

ZX81 ORIGINALS FOR SALE. Football Manager Galaxians Othello Fantasy Games Backgammon Games-tape 2 £10 the lot or swap Spectrum games Barnsley 0226 710119 after 6 pm

SELL ZX81 GAMES including Parmen Invaders, ZX Gulp Flight Simulation Mazogs Super Chopper Pssst Frogger Fantasy Games, QS Scramble Invasion Force £3 each tape (Mazogs £6) Tel Hornchurch Essex 42642.

ZX81 16K Ram Hopper QS Scramble 3D Monster Flight and ZX Gal also cassette recorder neat bargain for £80 ono Tel (0623) 640629 (Mansfield) or will swap for 48K ZX Spectrum

ZX81 16K, Filesixty keyboard software plus 14in b/w portable tv As new condition £80 ono Tel 0742 740208 after 6 pm

LARGE COLLECTION ZX81 BOOKS, £1 50 each see list Machine code test tool, Artic Chess Psion Chess £2.50 each Pearson 52 Stocks Green Castle Acre King's Lynn Norfolk.

ZX81, Basic leads and accessories, £30 ono Tel (0753) 45308

16K ZX81 and printer plus two books, manual cassette leads and games (3D MM etc) £80 Tel Llanarmon-Yn Ial (082 43) 259

SPECTRUM 48K printer Ferguson cassette £200 of software including Scrabble Address etc £200 for the lot quick sale Tel 01-868 7127 after 8 pm

48K SPECTRUM amplifier joysticks, interface programmable interface software including Jetpac Atic Atac and magazines, £150 or swap for Commodore 64 and tape recorder Tel Minsterworth 484 ask for Martyn

ORIGINAL SPECTRUM SOFTWARE for sale Flight Simulation £2 50 Spectrum Computing Nos 1 and 2 £2 each Tel David Reading (0734) 661401 after 4 pm Also Horizons for £1 50

16K ZX81 plus manual, PSU etc Software worth £80 plus many magazines Selling for £60 ono Ideal for beginner Tel 01-554 9530 (ring after 4 30 pm)

48K SPECTRUM with £300 of software Sell for £280 ono Tel 01 903 4062 after 5 pm

SPECTRUM SOFTWARE for sale One-third of original cost plus 50p p&p Valhalla Scrabble Timegate Chequered Flag Arcadia Chess Hunter Killer (Protek) Harrier Monopoly Android 2 Backgammon and many more Tel 0702 617808

SPECTRUM 48K six months old still under guarantee Eight games including Manic Miner and Chess £80 ono Also 16K ZX81 DK'Tronics keyboard joystick lots of software including ZX Compiler £75 ono Tel 01 992 6262.

48K SPECTRUM Mint condition and software including Alchemist Snowball Quill and cassette recorder worth over £300 sell for £200 or swap for Commodore 64 (plus cassette deck) Tel 01 421 1108 ask for Simon

48K SPECTRUM and full size DK'Tronics keyboard and fuller programmable sound generator and joystick interface and £70 of software including Fourth VU-file and assembler plus four books and micro drive order form £200 Tel Andrew at Orpington 0689 24745

SPECTRUM GAMES for sale or swap Black Crystal Football Manager Trans-Am Ant Attack. Tel 01 807 8864

SPECTRUM SOFTWARE including Lunar Jet Man Circus Scramble Psion and other ultimate games plus Pascal and Forth Telephone for details 01 723 8947 after 5 pm Ask for Peter

NEW RELEASES

BLUFF

Over the Christmas period it s possible some of you indulged in a little bit of gambling (I m not going to name names) — perhaps at cards

Well if you thought it was humiliating being blitzed by a human opponent, try being beaten by a machine *Brag* for the 48K Spectrum does every thing a human adversery would do including bluff, except that it does it better

Brag is actually one of the most entertaining games I've played in ages, simply because the idea of trying to 'out-psyche', ie, bluff a computer that you have a wonderful hand when in fact it stinks, is so appealing

The computer doesn't cheat, but you may find it pretty difficult to believe on occasion — my advice would be not to play this game near breakable objects

Program *Brag*
Price *£4 95*
Micro *Spectrum 48K*
Supplier *T Lebon Little Bravs*
Bravs Lane
Rochford
Essex SS4 3RP

ROVING EYES

Danger Ranger is a sort of *Manic Miner* for the Dragon 32 The author is Ken Kalish who also wrote *Phantom Slayer* and *Invaders Revenge.*

There are several screens of action as you try to move your hero through the chamber of pasha to the acid chamber, collecting treasure chests as you go

To leave the first chamber, you must collect 10 keys which are located at the ends of a series of platforms Attempting to thwart your attempts are floating urns, radioactive bats and roving eyes — these must either be avoided or blasted with your laser

The joystick is used to make *Danger Ranger* walk left and right or duck and jump As is common with Microdeal's games, there is a choice of screen colour

Program *Danger Ranger*
Price *£8*
Micro *Dragon 32*
Supplier *Microdeal*
41 Truro Road
St Austell
Cornwall PL25 5JE

50 SCREENS

Bubble Trouble is an arcade game with definite *Prisoner* overtones, in that the baddies are large balloons that suffocate you on contact

There, however the similarity ends You are a burglar whose aim in life is to steal things — stealing things accumulates points

Your only defence against the nasty rovers is your fire button which sends them scurrying back to wherever it is that balloons live — the problem is, though, that it only works intermittently once every 10 seconds in fact

There are 50 screens of action and a choice of three skill levels Even the slowest is supposed to be pretty fiendish

Program *Bubble Trouble*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Arcade Software*
Technology House
32 Chislehurst Road
Orpington
Kent

HIGH RISE

It may seem a bit surprising, but there are not all that many versions of that old standby *Bomber Run*, also called *Blitz*, on the Commodore 64

In fact *Bomber Run* by Soft Cell is the first I've seen It s a version of the one printed in this magazine a few months ago, but now largely converted into machine code and with other new features

The idea of the game, simply, is to bomb a space for your aircraft to land in a city of high rise blocks before your fuel runs out — it's a mixture of 'shoot em up' and tactics to score really high points

Program *Bomber Run*
Price *£4 95*
Micro *Commodore 64*
Supplier *Softcell*
28 Atkinson Drive
Newport IoW

BIBLE BELT

Jericho Road is a text adventure game based on themes from the Bible The program is set in southern Israel and you must survive Roman occupation and cope with religious persecution

Your task is to undertake a special mission on behalf of the downtrodden minority and help decode an ancient puzzle

Other than the religious themes the game is basically a standard text adventure It understands the usual two-word commands like *Go North* or *Get Donkey* (well, it makes a change from *Get Magic Ring)* and there is a Help routine

There are apparently several ways of accomplishing your objectives, so the game does not provide a *Save* routine For younger players, there is a slightly simplified version of the game on the same tape

Program *Jericho Road*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *Shards Software*
189 Eton Road
Ilford
Essex IG1 2UQ

TAKE-OFF

There have been a number of letters recently asking for a *Flight Simulator* for the Vic20 which will run on the unexpanded machine Given the number of different calculations required to produce a simulation that is even half way reasonable, it seemed unlikely to fit one in 3 5K

However, *Flight 015* is just that, a game in which you take off, fly and land an aeroplane using 10 instruments

It's supposed to be a difficult game to master and obviously the graphics have to be limited but all the control instruments are displayed and the Vic's sound is used to great effect

Program *Flight Zero One Five*
Price *£5 95*
Micro *Vic20*
Supplier *AVS*
Ferranti House
Grafton Way
Basingstoke
Hampshire RG22 6HY

BAITED

Hooked is a fishing game for the Dragon 32 You might think that fishing is an unlikely sport to be computerised, its appeal depending, seemingly, on outdoor things like the lap of the water, the cry of the birds, the mustard in the sandwiches, still

Hooked is for one or two players and you must try to catch as many fish as possible by judging the correct positioning and strength for the cast

Should you actually manage to hook a fish you must then land it, guiding it into the bottom of the landing net The computer keeps score allotting points according to the species and weight of each fish caught

Program *Hooked*
Price *£5 75*
Micro *Dragon 32*
Supplier *Shards*
189 Eton Road
Ilford Road
Essex IG1 2UQ

ANAGRAMS

Pharaoh s Tomb is an adventure game for the Electron Your task is to find a Pharaoh's mask and 500 pieces of gold

Puzzles in the game take the form of anagrams and logical reasoning and the input is mainly by single key presses

Time is of the essence and if you take too long at any point to open the various doors, nasty mummies and spiders are likely to leap out at you One of the first adventure games for the new machine

Program *Pharaoh s Tomb*
Price *£7 90*
Micro *Electron*
Supplier *A + F Software*
Unit 8
Canal Side Industrial Estate
Woodbine Street East
Rochdale
Lancashire OL16 5LB

IN TUNE

For a cheap home micro the Oric has pretty good sound much better than its nearest rival the Spectrum Despite this I have seen very few music editor programs — *Composer* being one of these few

The program allows the typing in of three part music in any key, in 3/4 or 4/4 time up to 80 bars This music may then be modified in many ways and the music saved on cassette

The cassette inlay folds out to become an instruction sheet and the program comes with a demo tape of Mozart's *Eine Kleine Nachtmusik* which should soothe the most jagged post Christmas hangover

Program *Composer*
Price *£6 50*
Micro *Oric 1*
Supplier *Sector 7 Software*
PO Box 8
Newton Abbot
Devon
TQ12 1UE

INGENIOUS

Since I have never been overly impressed with adventures involving magic rings, quests, dwarves, dragons and spells, I am obviously out of touch with the majority of adventure game buyers Nevertheless, I think that *Dennis Through the Drinking Glass* is the best text adventure I have ever played

Given the title one could have been forgiven for thinking that the game consisted of a couple of nice jokes and little more In fact it is astonishingly complex and ingeniously planned

The object of the game is to get Dennis to the Gravediggers Arms, the first task being to get out of number ten without being spotted by Maggie

Without giving any of the game away let me just say that I eventually mastered this seemingly simple task after around 10 hours of play It s reasonably logical in an *Alice in Wonderland* kind of way, but horrendously difficult to figure out

If anyone else out there is playing Dennis, please send me, in a plain brown envelope, the answers to the following questions What use is the Lawnmower? Can anything useful be done with the frog? What about the memoires — how do you open them to the correct page?

This could be the place to start if you want to try a text adventure One final point, this game was written using the *Quill* from Gilsoft

Program *Dennis through the Drinking Glass*
Price *£5 50*
Micro *Spectrum 48K*
Supplier *Applications*
8 St Pauls Road
Peterborough PE1 3DW

POACHED

Peaksoft has been providing Dragon software for quite some time now Its latest release is a machine code arcade game called *Ossie*

Ossie is an Osprey with a hard life For one thing he is responsible for the feeding of five hungry chicks For another poachers keep raiding his nest while his back is turned

Using either keyboard or joystick, you must make *Ossie* dive for his dinner and fight off the poachers by plastering' them, which is a euphemism for something fairly nasty that doesn t involve lasers

Program *Ossie*
Price *£6 95*
Micro *Dragon 32*
Supplier *Peaksoft*
7 Hawthorn Crescent
Burton on Trent
DE15 9QP

VITAL LINK

Terminal Software is building a strong reputation with its Commodore software The latest release for the Commodore 64 is *Stellar Dodger*

This is pretty much your standard space game although very well done You are as is often the case, an interstellar shuttle pilot Your task is to provide the vital link between your mothership and various supply dumps

You must not only master docking and landing but also avoid ever-more dense asteroid belts The game can be played with either joystick or keyboard and will run in demo mode if required

Program *Stella Dodger*
Price *£7 95*
Micro *Commodore 64*
Supplier *Terminal Software*
28 Church Lane
Prestwich
Manchester M25 5AJ

GOLD GRABBER

Blowtorch Blaster is the unsubtle title of a new arcade game from Touchstone Software

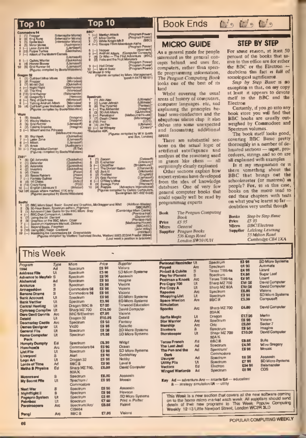
You play a Luke Skywalker type (Handsome Harry) self-confessed "coolest space pilot in the galaxy"

Your only interest in life is money and you accumulate this by grabbing the gold from a series of planets

As you might expect, this involves a certain amount of landing and taking off — a difficult task made worse still by sulphur storms, energy bolts and lightning

Program *Blowtorch Blaster*
Price *£5 95*
Micro *Oric 48K*
Supplier *Touchstone*
61 Highfield Road
Saxilby
Lincoln

New Releases is designed to let people know what software is coming on to the market If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12-13 Little Newport Street, London WC2R 3LD.



Top 10

Commodore 64

1 (1) Frogger (Interceptor Micros)
2 (6) King Kong (Interceptor Micros)
3 (5) Sprite Man (Interceptor Micros)
4 (5) Motor Mania (Audiogenic)
5 (—) Laser Zone 64 (Llamasoft)
6 (10) Purple Turtles (Quicksilva)
7 (—) Attack of the Mutant Camels (Llamasoft)
8 (—) Caltic Warrior (Quicksilva)
9 (4) Hover Bovver (Llamasoft)
10 (6) Grid Runner 64 (Llamasoft)
(Figures compiled by Boots/Websters)

Dragon 32

1 (1) Cuthbert Mine Moves (Microdeal)
2 (9) Frogger (Microdeal)
3 (7) Mined Out (Quicksilva)
4 (—) Night Flight (Salamander)
5 (2) The King (Microdeal)
6 (10) Grid Runner (Salamander)
7 (6) Dragonfly 3 (Hewson)
8 (—) Ring of Darkness (Wintersoft)
9 (—) Talking Android Attack (Microdeal)
10 (4) Cuthbert goes Walkabout (Microdeal)
(Figures compiled by Boots/Websters)

Vic20

1 (5) Arcadia (Imagine)
2 (4) Wacky Waiters (Imagine)
3 (6) Grid Runner (Llamasoft)
4 (2) Catcha Snatcha (Imagine)
5 (—) Wizard and the Princess (Melbourne House)
6 (6) Sky Hawk (Quicksilva)
7 (—) Laser Zone (Llamasoft)
8 (—) Attack (Llamasoft)
9 (7) Amok (Audiogenic)
10 (—) Plague/Atari Demon (R Tel)
(Figures compiled by Boots/Websters)

ZX81*

1 (6) QS Asteroids (Quicksilva)
2 (1) Defender (Quicksilva)
3 (6) Asteroids (Quicksilva)
4 (2) Invaders (Quicksilva)
5 (4) Chess (Psion)
6 (8) Space Raiders (Psion)
7 (—) Fantasy Games (Psion)
8 (8) 1K Chess (Artic)†
9 (10) Crazy Kong (PSS)
10 (—) English Literature II (Sinclair)
*All 16K Attack where marked, †1K only
(Figures compiled by Boots/Websters)

BBC*

1 (—) Martian Attack (Program Power)
2 (7) Mine Gertie (Program Power)
3 (1) White Knight Mk II (BBC)
4 (—) Escape From Moonbase Alpha (Program Power)
5 (—) Hopper (Acornsoft)
6 (—) Android Attack (Computer Concepts)
7 (6) Dr Who — The First Adventure (BBC)
8 (3) Felix and the Fruit Monsters (Program Power)
9 (—) Hell Driver (Program Power)
10 (—) Micro Basic (Program Power)
*All Model B only
(Figures compiled by Micro Management, Ipswich 0473 59181)

Spectrum

1 (1) Atic Atac (Ultimate)*
2 (2) Lunar Jetman (Ultimate)
3 (6) The Pyramid (Fantasy)*
4 (—) The Alchemist (Imagine)
5 (3) 3D Ant Attack (Quicksilva)
6 (—) Penetrator (Melbourne House)
7 (7) Death Chess (Micromega)
8 (10) Flex (CDS)
9 (4) Jet Pac (Ultimate)
10 (—) Mr Wimpey (Ocean)*
*Requires 48K.
(Figures compiled by W H Smith and Son, London)

Atari

1 (1) Zaxxon (Datasoft)
2 (3) Enchanter (Infocom)†
3 (—) Chopfiter (Broderbund)
4 (—) The Dorsen Baton (Channel 8)
5 (2) Zork III (Infocom)†
6 (8) Firefleet (English)†
7 (7) Grid Runner (Llamasoft)
8 (—) O'Riley's Mine (Datasoft)
9 (9) Savage Pond (Starcade)
10 (4) Preppie (Adventure International)
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Books

1 (2) BBC Micro Start Basic Sound and Graphics, *McGregor and Watt* (Addison-Wesley)
2 (3) 30-Hour Basic, Spectrum edition, *Prigmore* (BBC/NEC)
3 (1) Advanced User Guide for the BBC Micro *Bray* (Cambridge Micro Centre)
4 (—) BBC Disk Companion, Ledden (Prentice Hall)
5 (7) Using the 64 *Gerrard* (Duckworth)
6 (6) Graphics on the BBC Micro *Cryer* (Prentice-Hall)
7 (—) Spectrum Hardware Manual, *Dickens* (Melbourne House)
8 (—) Beyond Basic, *Freeman* (BBC/NEC)
9 (10) Using BBC Basic *Cockerel* (John Wiley)
10 (—) Mastering the Commodore 64 *Greenshields* (Int/Attack)
(Figures compiled by Watford Technical Books, Watford 0923 23384 Prestel 28644)
(Last week's position in brackets)

Book Ends

MICRO GUIDE

As a general guide for people interested in the general concepts behind and uses for, computers, rather than specific programming information, *The Penguin Computing Book* looks one of the best of its kind

Whilst covering the usual areas of history of computers, computer languages etc, and explaining the principles behind semi-conductors and the ubiquitous silicon chip it also delves into some unexpected and fascinating additional areas

There are substantial sections on the actual logic of artificial intelligence and analysis of the reasoning used in games like chess — all surprisingly clearly explained

Other sections explain how expert systems have developed from the idea of knowledge databases One of very few general computer books that could equally well be read by programming experts

Book *The Penguin Computing Book*
Price *£5 95*
Micro *General*
Supplier *Penguin Books, 536 Kings Road, London SW10 0UH*

STEP BY STEP

For some reason, at least 50 percent of the books that arrive in this office are for either the BBC or the Electron — doubtless this fact is full of sociological significance

Step by Step Basic is no exception in that, on my copy at least it appears to devote itself to the BBC and the Electron

Certainly, if you go into any book store you will find that BBC books are usually outweighed by Commodore and Spectrum volumes

The book itself looks good, covering BBC Basic pretty thoroughly in a number of delimited sections — input, procedures, strings and so on are all explained with examples

Is it my imagination or is there something about the BBC that brings out the schoolmaster (or mistress) in people? For, as in this case, books on the micro tend to end their chapters with tests on what you've learnt so far — doubtless very useful though

Books *Step by Step Basic*
Price *£5 95*
Micro *BBC/Electron*
Supplier *Lifelong Learning, 55 Milton Road, Cambridge CB4 1XA*

This Week

Program	Type	Micro	Price	Supplier
1994	Ad	Spectrum	£5 95	Visions
Address File	Ut	Spectrum	£3 95	SD Micro Systems
Advance to Mayfair	S	Spectrum	£6 95	Assassin
Alchemist	Ad	Spectrum	£5 50	Imagine
Arcturus	S	Spectrum	£5 95	Visions
Armageddon	S	Commodore 64	£5 95	Visions
Banana Drama	S	Commodore 64	£5 95	Visions
Bank Account	Ut	Spectrum	£8 95	SD Micro Systems
Bank Verifier	Ut	Spectrum	£3.95	SD Micro Systems
Central Heating	Ut	Dragon/BBC B	£7 95	Torwood Education
Cymraeg Compiler	Ut	Sharp MZ 700	£14.00	David Computer
Dare Devil Dennis	Arc	BBC B/Electron	£7.95	Visions
Detaid	Ut	Dragon 32	£10.95	Detaid
Doomsday Castle	Arc	Spectrum	£6 50	Fantasy
Demos Designer	Ut	Vic20	£5 95	Galactic
General File	Ut	Spectrum	£5 95	SD Micro Systems
Home Computer Pack	Ut	Spectrum	£9.95	SD Micro Systems
Humpty Dumpty	Ed	Spectrum	£6.20	Widgit
Hunchback	Arc	Commodore 64	£5 95	Ocean
List File	Ut	Spectrum	£3 95	SD Micro Systems
Liverpool	S	Atari	£8 95	Corblshley
Logo Art	Ut	Dragon 32	£5 95	Nobby
Lords of Time	Ad	BBC B	£9 95	Level 9
Maths & Physics	Ed	Sharp MZ 700, 80A/K	£8.00	David Computer
Moonraend	S	Spectrum	£6.00	Assassin
My Secret File	Ut	Spectrum / Commodore	£9 95	Mosaic
Next War	S	Spectrum	£6 95	Assassin
Nightflight II	S	Spectrum	£5 95	Hewson
Pagepro System	Ut	Spectrum	£5 95	SD Micro Systems
Paintbox	Ut	Spectrum	£7 95	Print n Plotter
Paratroopers	Arc	Spectrum/Arc/CBM64	£8.55	Rabbit
Pengi	Arc	BBC B	£7.95	Visions
Personal Reminder	Ut	Spectrum	£3 95	SD Micro Systems
Played	Arc	Spectrum	£6 95	Automata
Pinball & Cubits	S	Texas TI99/4a	£4 95	Lizard
Play for Planets	S	Spectrum	£4.95	Sugar Leaf
Postman s Knock	Arc	Texas TI99/4a	£4 95	Lizard
Pro Copy 700	Ut	Sharp MZ 700	£10 95	David Computer
Pro Copy A	Ut	Sharp MZ 80A	£10 95	David Computer
Rapedes	Arc	Spectrum	£5.95	Visions
Shopping List	Ut	Spectrum	£3 95	SD Micro Systems
Space Mission Simulation	Arc	BBC B	£3.99	Compusoft
Spooks	Arc	Sharp MZ 700 80A/K	£4.00	David Computer
Sprite Magic	Ut	Dragon	£17 95	Merlin
Star Warrior	Arc	Spectrum	£8 95	Visions
Starship	Arc	Oric	£8.00	Sector 7
Stonkers	S	Spectrum	£5 50	Imagine
Storekeeper	Ut	Sharp MZ 700 80A/K	£10.00	David Computer
Tense French	Ed	BBC B	£8.95	Sulis
The Last Jedi	Ad	Spectrum	£4.95	Miles Gregory
The Pen and the Dark	Ad	Spectrum/ Commodore	£8 95	Mosaic
Usurper	Ad	Spectrum	£6 95	Assassin
Utility File	Ut	Spectrum	£7 95	SD Micro Systems
Vectors	Ed	Electron	£24 95	Salamander
Winged Warlords	Ad	Spectrum	£5 95	CDS

Key Ad — adventure/Arc — arcade/Ed — education/ S — strategy simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, Popular Computing Weekly 12-13 Little Newport Street, London WC2R 3LD

Ziggurat



Dull as ditchwater

I have just attended what I am sure will be the last of the big microcomputer shows — the *Your Computer Xmas Fair*.

The decline of The Big Fair was beginning to be felt round about the time of the *Midlands Computer Fair* early this summer but the clearest indication was the *Personal Computer World Show* in September. It was at this show that the crowds really began to vote with their feet and stayed away. It was also at the *PCW* show that exhibitors began to weigh up the cost of coming to the shows in terms of what they actually got out of the whole affair.

In a rather simple-minded manner exhibition organisers seemed to think that the computer using public was a never ending source of shekels. The organisers also seemed to think that the computer exhibitor was willing to continue paying out for the privilege of exhibiting at increasing rates.

By the time of the *Northern Computer Fair* at Manchester the cost of entry for an adult was £3 and the price for a child was £2.00. The costs of stalls for exhibitors had also increased at a corresponding rate.

Many of the 'big' names in computing were absent and the crowds had diminished — the bubble had truly burst.

The *Personal Computer World Show* was not a flop as such but it was not as successful as had been promised. What happened was that organisers and exhibitors had begun to believe their own propaganda. They somehow felt that the "micro boom" was not like other booms, they saw it as having some charmed existence. It has not.

I am in love with computers and computing because of what I can achieve through computers. A good friend of mine, an artist, has recently bought a BBC Model B and he thinks that programming is more creative than painting. I agree with my friend and that is why I find computing so engrossing.

All that most exhibitions seem to offer is a chance for young people to play games. That which is of deeper interest is almost nil.

Now, if a person wishes to play computer games, they go to any of the high street stores and play the games there. There are still black spots — I heard in one shop "Oh I am sorry you can't try that game out. It takes up too much time" — not, I hasten to add, one of the larger chains.

If people want to play games without paying they go to retailers considerably cheaper than most of the 'big' computer exhibitions. With many of the larger software houses not exhibiting at shows, and larger retailers not bothering, why should the public bother? For those of us interested in the more creative aspects of computers most shows have nothing to offer. And so to the *Your Computer Xmas Fair* at Wembley.

Going round talking to people, both those attending and those exhibiting, there was the very strong feeling of "Never again". Many of the exhibitors had decided in future to attend only one or two shows a year, and those were shows mainly for the trade.

Talking to one exhibitor he made two very telling comments. First, "They're mainly kids and they're not buying". The second telling comment was concerned with whether a game he was writing could be called a similar name to the arcade game he was copying. I suggested that the safest way out was to design a totally new game. "But it's so difficult to think of new ideas," he protested.

Could it be, we ask ourselves, that the reason that kids were playing and not buying was that so many games these days seem to be no more than old wine in new bottles?

Could it be that people are staying away because shows are now dull as ditchwater? ■

Boris Allen

Puzzle

Ground work

Puzzle No 90

The boys at Greyfriars School recently had to map out the school grounds. As shown in the diagram, they marked out a base line on the ground exactly 47 yards in length.

Using a theodolite, they took the bearing of the school flagpole from point *A*, which was found to be at exactly right angles to the base line. Moving to point *B*, by taking a second bearing they were able to calculate the distance of the flagpole from both ends of the base line.

Curiously, both these distances were found to be an *exact* number of yards in length.

What was the bearing, in degrees, of the flagpole from point *B*?

Solution to Puzzle No 85

The following program tests all numbers from 100 to 999 to see if the sum of the first power of the first digit, the second power of the second digit and the third power of the third digit is equal to that number.

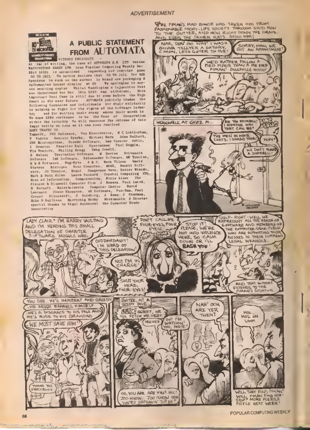
```
10 FOR N = 100 TO 999
20 LET N$ = STR$ N
30 LET T = VAL N$(1) + VAL N$(2) * VAL N$(2) +
VAL N$(3) * VAL N$(3) * VAL N$(3)
40 IF T = N THEN PRINT N
50 NEXT N
```

This reveals that, apart from 175, there are three other three digit numbers with this property: 135, 518 and 598.

Winner of Puzzle No 85

The winner is P Jordan, Kingshurst, Birmingham, who receives £10.




10th ZX MICROFAIR
A PUBLIC STATEMENT FROM AUTOMATA
WITHOUT PREJUDICE -
At time of writing, the case of AUTOMATA U.K. LTD versus WADDINGTONS GAMES LTD (see Popular Computing Weekly Dec 22nd 1983) is unresolved regarding our computer game GO TO JAIL. We hereby declare that GO TO JAIL for 48K Spectrum is back on the market in brand new packaging & reformatted loader display at £6. We apologise to anyone awaiting copies. Whilst Waddingtons injunction (last) was threatened for Dec 15th 1983 was withdrawn, this important Test Case is still due to come before the High Court in the near future. AUTOMATA publicly thanks the following Companies and individuals for their solidarity in helping us fight for the rights of the Software Industry and for putting their money where their mouth is. We hope 1984 continues to be the Year of Cooperation within the industry. We will announce the outcome of this legal battle as soon as it has been resolved.
MANY THANKS TO
Tamsoft, PSS Software, Vox Electronics, M C Lothlorien, P Yedrie, Dominic Sparks, Michael Bore, Adam Bulbert, CRL Microsystems, Ricardo Software, Lee Spencer Artic, I Greaves, Prentice Hall, Spectadrom, Paul Goggie, Tim Wreford, Phillip Bragg, Greg Jewell, P Wesley, Temptation Software, G Davies, Britannia Software, IBK Software, Salamander Software, DK Tronics, K & S Software, Bug-Byte, A & F, Mark Tilson, David Stevens, Microgen, Your Computer, MSX, Rabbit Software, JB Tronics, Mogul, Dangerous Dave, Xavier Wierdo, Mark & Ruth Allen, Leece Bushard, Crystal Computing, CRL, Mine of Information, Computesolve, Doris Allen, The Stevens & Stanwell Computer Club, J Bowers, Paul Laird, B Barnatt, Malcolm Jarvis, Computer Choice, David Lawrence, Simon Shooster, AM Software, Pac-Man, Paul Cooper, Silversoft, J Goldberg, J Rose, J Sherman, Mike O Sullivan, Microchip Micky, Micromania, J Shooter, special thanks to Nigel Backhurst, the Computer Trade Association
THE PIMAN'S MAD BINGE HAS TAKEN HIM FROM FASHIONABLE NIGHT-LIFE SOCIETY THROUGH SKID ROW TO THE GUTTER, AND NOW RIGHT DOWN THE DRAIN AND EVEN THE SEWER RATS AVOID HIM!
NAH, DON' GO WAY' I WASH GONNA TELLYER A SHTORY. C'MON, LESH GOTER TH PUB'
SORRY, MAN, WE GOT AN APPOINTMENT!
WE'D RATHER FOLLOW A PIED PIPER THAN A PIE EYED PIMAN! DULLSVILLE KIDDO!
MEANWHILE, AT CHEZ PI
AH THE DOORBELL! I WONDER WHO THAT CAN BE?
BING BONG
THE MEN IN WHITE COATS, I SHOULD THINK!
WHY?
WE DON'T HAVE A DOORBELL!
LADY CLAIR? I'M HARRY WULTING AND I'M HEADING THIS SMALL DELEGATION OF COMPUTER SOFTWARE MOGULS WHO..
GIDDARDAMIT! I'M HEAD OF THIS DELEGATION!
NO! I'M IN CHARGE!
SHUT YOUR HEAD, FOUR EYES!
DON'T CALL ME FOUR-EYES, FOUR EYES!
STOP IT! PLEASE, WE'RE NOT INTO VIOLENCE HERE, SO CALM DOWN OR I'LL BASH YOU!
GULP- RIGHT- WELL, WE REPRESENT ALL THE HEADS OF SOFTWARE AND MEMBERS OF THE COMPUTER-USING PUBLIC WHO ARE SUPPORTING YOUR BOSSES IN THEIR CURRENT LEGAL WRANGLE.
AND THAT SUPPORT EXTENDS TO THE PIMAN'S SITUATION
YOU SEE.. HE'S IMPUDENT AND GREEDY
..HE NEVER BEHAVES HIMSELF
..HE'S A DISGRACE TO HIS PALS AND HE'S RUDE TO HIS GRANDAD
..WE MUST SAVE HIM!
THANK YOU EVERYBODY
LATER, AT A SEEDY DIVE
EEK! GERROFF, OR I'LL FETCH ME UBBY
HEH HEH
OY I'M WATCHIN' YOU, MATE!
OH, YOU ARE ARE YOU? HIC! JOO KNOW.. JOO KNOW OOH YOU'RE SHPEAKIN TO? EH?
NAH! OOH ARE YER THEN?
HOL.. HOL ON UMM
WILL THEY FIND PIMAN? WILL PIMAN FIND HIMSELF? MORE PUERILE PIFFLE NEXT WEEK!